



United Nations Development Programme

# POTENTIAL IMPACT OF COVID-19 ON POVERTY AND FOOD INSECURITY IN THE ARAB REGION



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## 1. Introduction

The COVID-19 shock is interacting with long-lasting challenges in the Arab region. The region is characterized by low economic growth with an average GDP annual growth of 3 percent over the past 10 years and 1.5 percent GDP annual growth in 2019. Additionally, the region suffers from structural deficiencies in economic policies, high poverty rate, high inequality of opportunities and unemployment (United Nations Economic and Social Commission for Western Asia – ESCWA and Economic Research Forum – ERF, 2019; World Bank, 2020b). The pandemic is expected to exacerbate poverty. Using data from 14 non-Gulf Arab countries, Abu Ismail (2020) estimated an additional 9 million people living under \$1.9 poverty line by 2021. More recently, countries such as Lebanon and Egypt witnessed massive devaluation of currency, which resulted in inflation and welfare deterioration for low-income groups. In countries such as Sudan, Syria and Yemen, conflicts and natural disasters result in displaced, refugee and migrant populations, with potentially serious economic, health and security consequences.

Countries in the region are net food importers, with all countries importing more than 30 percent of their cereal consumption. Such dependency leaves the food security of these countries, at the macro level, vulnerable to any change in international cereal prices or any disruption to the global cereals supply chain. And at the micro level, food insecurity is highly correlated with poverty, as poor households spend between 20 percent in Iraq (SWIFT, 2017) and 65 percent in Somalia (HFS, 2016) of their total expenditure on food.

The response to the COVID-19 crisis has primarily been a health response, but the measures taken to contain the disease (such as lockdown, social distancing, quarantines, curfews, etc.) came with serious social and economic implications. The measures implemented, both nationally and globally, resulted in a decrease in tourism revenues, loss of jobs, a decrease in income and massive disruption

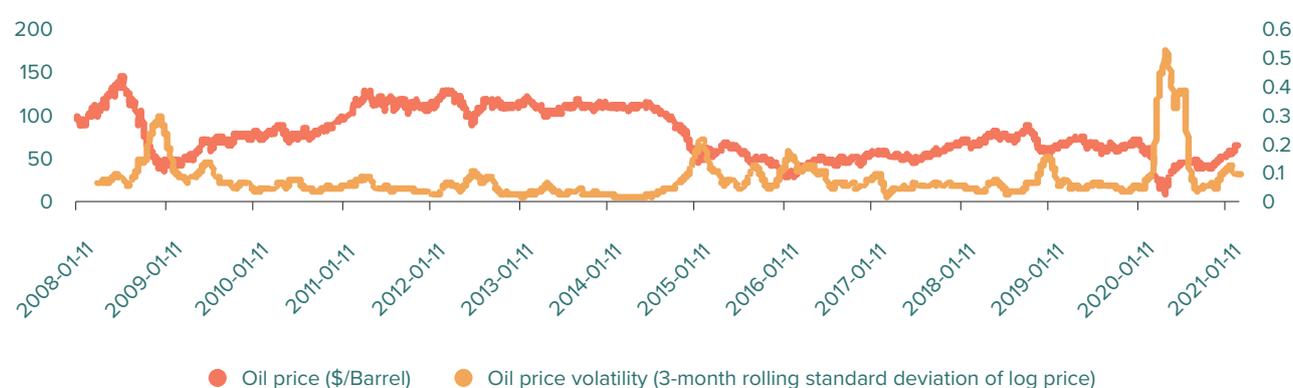
to the education system. Low levels of preparedness and limited resources and institutional capacities, as well as damaged infrastructure in countries experiencing conflict and fragility, will severely curtail the effectiveness of the response.

In parallel, oil prices decreased by 60 percent between February and April 2020, reaching an average of US\$23.33 in April 2020, before increasing again to \$40.47 in October 2020 (Figure 1). Although it was temporary, the oil crisis was exacerbated by COVID-19 following a collapse in the global oil demand due to lockdowns, quarantines and

the reduction in air and road travel (Arezki and Nguyen, 2020; IMF, 2020a).

Meanwhile, oil-importing countries have witnessed a decrease in remittances, foreign direct investment (FDI) and grants from oil exporters (United Nations, 2020). In Egypt, the loss of tourism and Suez Canal revenues, as well as the decrease in remittances from Egyptian expatriates<sup>1</sup>, was expected to result in a decrease of household consumption and expenditure by 9 percent, to 10.6 percent of average household income (Breisinger *et al.*, 2020).

**Figure 1: Global price of Brent Crude, US dollars per barrel (monthly, not seasonally, adjusted)**



Source: Federal Reserve Economic Data

The shock is having negative impacts on health status, economic growth, individuals' income and food security. Earnings of informal workers were expected to decline by 82 percent in low- and lower middle-income countries, with women and young people expected to be the most affected (World Food Programme, 2020). These vulnerable groups, in addition to those working in hard-hit sectors and refugees, are more likely to fall into poverty and suffer from food insecurity. The shock will likely deepen pre-existing fragilities in already vulnerable countries and introduce fragility in middle- and high-income countries. Moreover, in conjunction with high debts and limited fiscal space, the shock is putting pressure on the Governments of the region and may negatively affect their capabilities in mitigating the social and economic impacts of the pandemic.

This paper is an attempt to understand the effects of the shock on poverty and food security in the Arab region. Using unconditional quantile regression (UQR), the paper studies the heterogeneous impacts of the demographic and socio-economic characteristics of individuals on income level and food security. Section one provides an overview of poverty and food security in the region.

Section two describes the methodology to be used and discusses the socio-demographic characteristics of the vulnerable groups who are more likely to fall into poverty and be food insecure. Section three describes the data used and the country contexts. Section four presents the estimated results. Section five provides an overview of the different measures implemented by the countries to mitigate the social and economic impacts of the shock. Finally, section six concludes the paper and provides policy recommendations.

<sup>1</sup> Remittances to Egypt actually ended up defying expectations and rising to a record high of \$30 billion in 2020, an 11% increase over the previous year. (World Bank, 2021).



## 2. Shock, poverty and food security in the Arab region

According to the latest estimates, the region's economies were estimated to have contracted by 4.3 percent<sup>2</sup> in 2020, more than the estimated global average of 3.3 percent (International Monetary Fund – IMF, 2021). The economies of conflict-affected countries shrank by as much as 12.4 percent in 2020.<sup>3</sup> This collapse in economic growth has resulted from the COVID-19 pandemic and the reduction in oil prices, magnified by decade-long challenges in the region. These challenges include high poverty rate, low economic growth, unemployment, deficiencies in economic policies, conflicts and natural disasters (United Nations, 2020; United Nations Development Programme – UNDP, 2020c).

Governments of the Arab countries have implemented different measures in an attempt to prevent the spread of the new virus. These measures include closing schools and workplaces, and enforcing quarantines, curfews, social distancing and lockdowns. The result has been a loss of jobs and sources of income for several groups in the society, increasing their likelihood of falling into poverty. These groups include those working in hard-hit sectors such as tourism and food services, and vulnerable groups such as those working in the informal sector, those with no access to social security and those with limited access to the internet and digital devices (UNDP, 2020c).

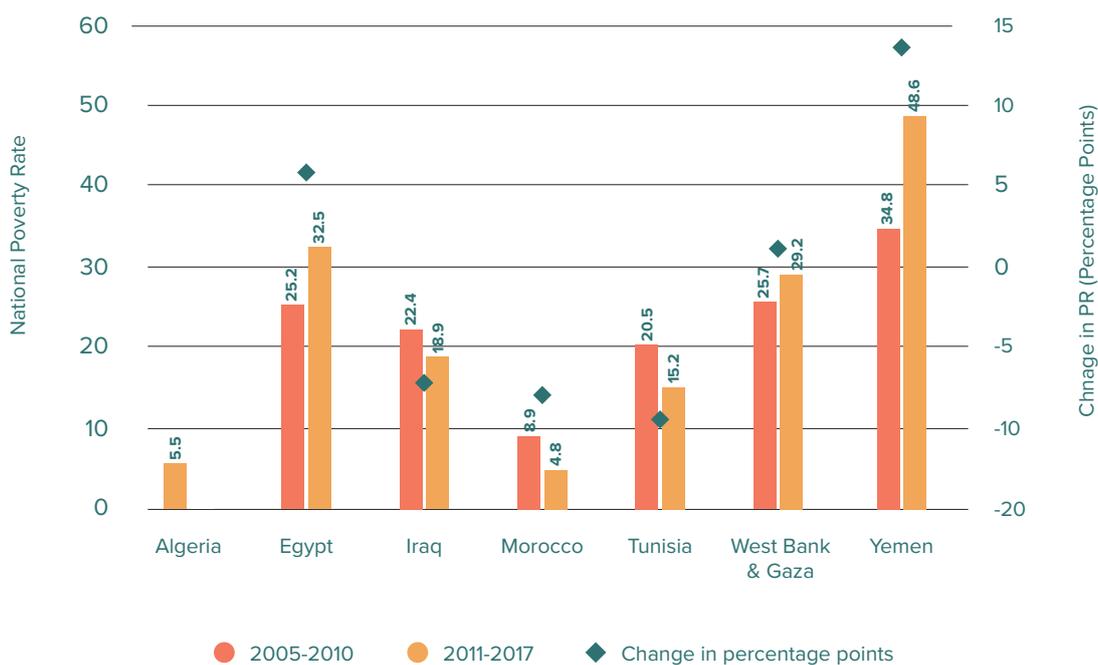
<sup>2</sup> Own calculations based on IMF's April 2021 estimates, World Economic Outlook update of April 2021.

<sup>3</sup> Ibid.

The oil price crisis affected both oil-exporting and oil-importing countries. However, for oil-importing countries, remittances could decrease as migrants may return to their home countries or reduce the remittance flows to their households. Remittances represent an important source of income and tax revenue for households in recipient countries, mainly in low-income and fragile countries. The World Bank initially expected remittance flows to drop by 8 percent in 2020, compared with the level in 2019. In countries such as Egypt and Jordan, where personal remittances represent 9 percent and 10 percent, respectively, of GDP in 2019, a potential decrease in remittance flows would negatively affect their fiscal balances and may result in social pressure on Governments (Sayeh and Chami, 2020; World Bank, 2020b; UNDP, 2020c).

Money metric poverty in the region was on the rise in several countries before the shock. In Egypt, an oil-importing country, the national poverty rate increased from 25.2 percent in 2010 to 32.5 percent in 2017. For conflict areas such as State of Palestine and Yemen, the national poverty headcount ratio increased between the periods of 2005–2010 and 2011–2017, which is expected given the loss of income and destruction of infrastructure. However, other countries succeeded in reducing poverty over the same periods, such as Morocco and Tunisia (Figure 2). These negative economic shocks are expected to exacerbate the poverty status in the region. Figure 2 shows that the poverty rate is according to headcount ratio. One third of the total Arab population is estimated to be poor as defined by national poverty lines. About 16 million people are expected to become poor as a result of the pandemic, and the number of poor people is expected to reach more than 116 million by 2021 (United Nations, 2020).

**Figure 2: Poverty headcount ratio at national poverty lines (% of population) and change in poverty rate (percentage points) in selected countries**



Source: World Bank (2020b)

Note: No poverty data are available for oil-exporting countries

Note: Survey years for Algeria (2011), Egypt (2010 and 2017), Morocco (2007 and 2013), Tunisia (2010 and 2015), Iraq (2006 and 2012), State of Palestine (2010 and 2016), Yemen (2005 and 2014)

Poverty is a multidimensional phenomenon that goes beyond money metric poverty. According to the global Multidimensional Poverty Index (MPI),<sup>4</sup> 15.8 percent of the population in 11 Arab States were considered

as multidimensional poor in 2019 (UNDP, 2019; World Bank, 2020a). As with money metric poverty, countries' progress towards reducing multidimensional poverty is heterogeneous. Less than 6 percent of the population is

<sup>4</sup> Regional and National MPI can be calculated based on the global MPI by changing some indicators to tailor it to the regional or country context. For more details see Arab Multidimensional Poverty Report (2017).

considered as multidimensional poor in countries such as Algeria (2012–2013), Egypt (2014), Jordan (2017–2018) and Tunisia (2018), while in some fragile countries such as Sudan (2014) and Yemen (2013), more than 40 percent of the population is considered as multidimensional poor (Table 1). Education is the most important challenge facing the region as deprivation in the education dimension contributes to more than 40 percent of overall multidimensional poverty in several countries, followed by deprivation in the health dimension. For Sudan (2014) and Yemen (2013), deprivation in standard of living is the main contributor to multidimensional poverty (Figure 3).

Before the pandemic, the Arab countries were not on track to achieve the Sustainable Development Goals (SDGs). Countries in the region face challenges in eliminating hunger (SDG2), achieving good health and wellbeing (SDG3) and quality of education (SDG4) (Sustainable Development Solution Network, 2019; United Nations, 2020). COVID-19 is expected to contribute to increased multidimensional poverty and put more pressure on achieving the SDGs. The measures implemented in the education system to control the spread of the virus, such as school closures and e-learning, are disruptive to

education, particularly taking into consideration the digital divide. Disruption to education also risks the possibility of some children not returning to school – with girls at risk of dropping out of school due to early marriage or the de-prioritization of girls’ education more generally – all of which contributes to lowering the number of years of schooling and school attendance rates and increasing multidimensional poverty.

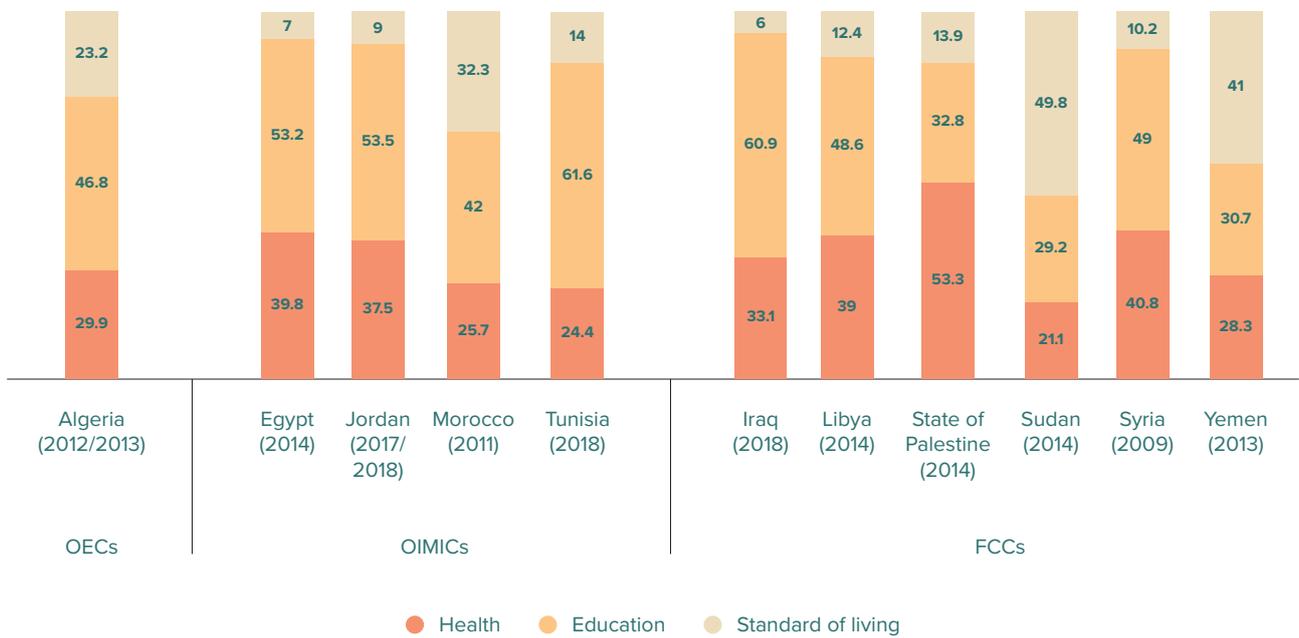
The pandemic is also likely to have an impact on the nutritional status of those children missing out on school meals and their families. Low-income countries in the region are particularly vulnerable due to unsafe drinking water, undernutrition, indoor air pollution and acute respiratory infections owing to deprivations in clean cooking fuel. These factors increase the risk of contracting the virus, which would further contribute to deepening poverty and inequality. Around 33 percent of the Arab region is therefore at risk since people face at least one of these COVID-19 risk factors and around 4 percent, who face all three risk factors, is at high risk (Alkire *et al.*, 2020). According to the United Nations (2020), 74 million individuals are at high risk of contracting the virus as they lack handwashing facilities.

**Table 1: Money metric and multidimensional poverty measures in selected countries (%)**

	MPI headcount	Population in severe multidimensional poverty	Population vulnerable to multidimensional poverty	National poverty line (2008–2019)	PPP \$1.9 per day (2008–2018)
<b>Oil-exporting countries</b>					
Algeria (2012–2013)	2.1	0.3	5.8	5.5	0.5
<b>Oil-importing countries</b>					
Egypt (2014)	5.2	0.6	6.1	32.5	3.2
Jordan (2017–2018)	0.4	0.0	0.7	14.4	0.1
Tunisia (2018)	0.8	0.1	2.4	15.2	0.2
Morocco (2011)	18.6	6.5	13.1	4.8	1
<b>Fragile/crisis countries</b>					
Iraq (2018)	8.6	1.3	5.2	18.9	2.5
Libya (2014)	2.0	0.1	11.4	..	..
State of Palestine (2014)	1.0	0.1	5.4	29.2	1
Sudan (2014)	52.3	30.9	17.7	46.5	12.7
Syria (2009)	7.4	1.2	7.8		
Yemen (2013)	47.7	23.9	22.1	48.6	18.8

Source: The 2020 Global Multidimensional Poverty Index (UNDP, 2020a)

**Figure 3: Contribution of deprivation in dimension to overall multidimensional poverty (MPI) for selected countries**

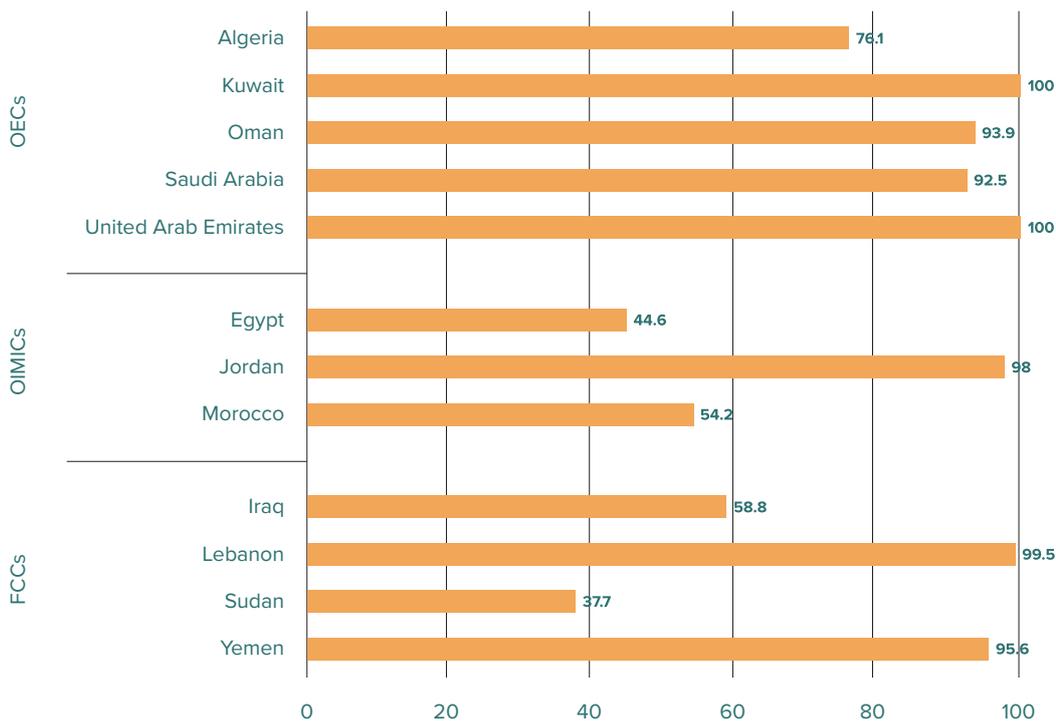


Source: The 2020 Global Multidimensional Poverty Index (UNDP, 2020a)

Furthermore, the shock was expected to have affected the food security status in the region through three main channels: disruption of food systems, loss of jobs and decrease in remittances. At the macro level, countries in the region are net food importers, with all countries importing more than 30 percent of their cereal

consumption (Figure 4). This high import dependency ratio leaves the countries vulnerable to any change in international cereal prices or any disruption to the global cereals supply chain that may result from lockdowns and all the precautionary measures adopted by the various cereal-exporting countries.

**Figure 4: Cereal import dependency ratio (%) (three-year average), 2015–2017**

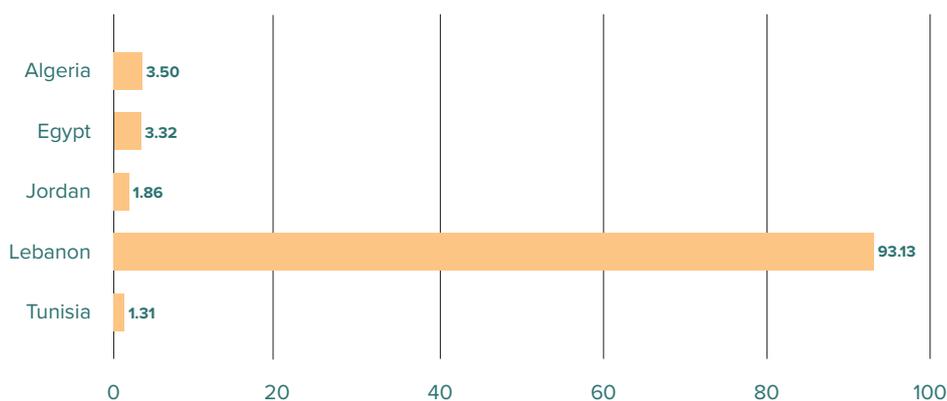


Source: Food and Agriculture Organization Corporate Statistical Database (FAOSTAT)

Restrictions implemented by several exporting countries put pressure on food importing countries. Such restrictions, in addition to containment measures and economic slowdown, resulted in an increase of domestic prices in some countries of the region. This was exacerbated by the depreciation of currencies in some countries and an unusual consumer behaviour during the first months of the pandemic (World Food Programme, 2020). In countries such as Lebanon, food inflation increased by more than

93 percent in the second quarter of 2020 compared with the first as a result of instability, in addition to the shock. Meanwhile, in other countries of the region such as Algeria and Egypt, the change in food inflation was less than 5 percent (Figure 5). Any increase in food prices would jeopardize the food security of the poor as they spend between 20 percent in Iraq (2017) and 65 percent in Somalia (2016) of their total expenditure on food.

**Figure 5: Quarterly food inflation change (%) in the monitored countries, Q2-2020 vs. Q1-2020**

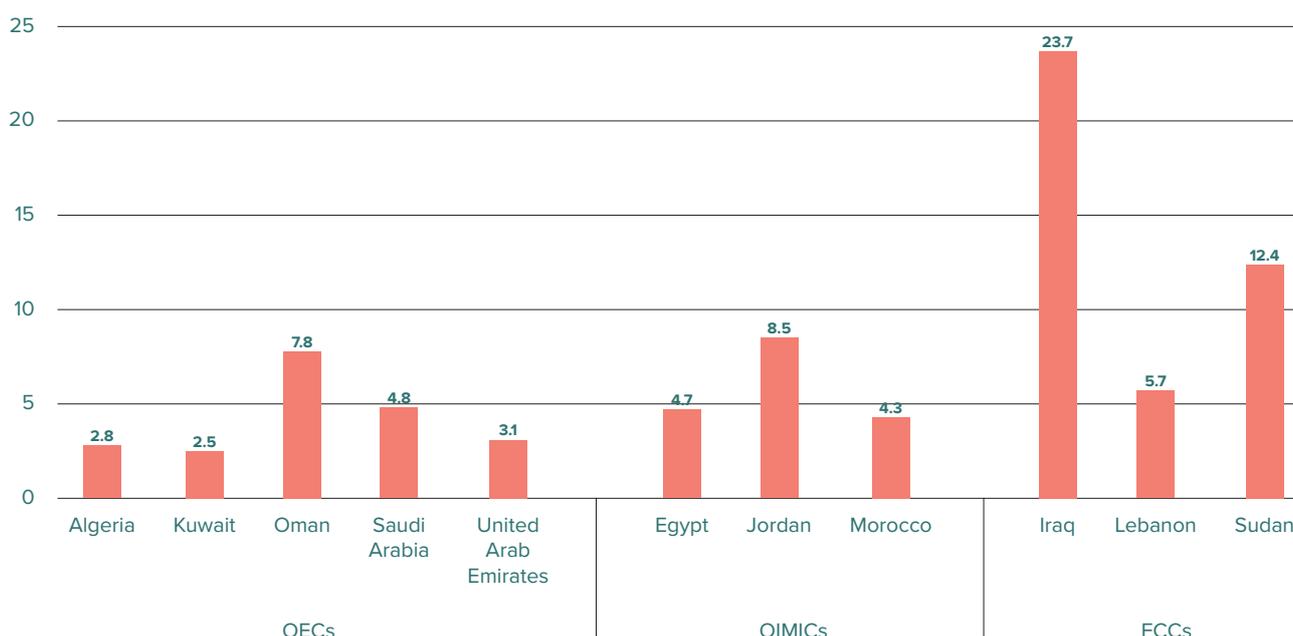


Source: [https://dataviz.vam.wfp.org/global-coverage-market-monitor-48-jul-2020?\\_ga=2.94053016.48250325.1604916911-1763838384.1604916911](https://dataviz.vam.wfp.org/global-coverage-market-monitor-48-jul-2020?_ga=2.94053016.48250325.1604916911-1763838384.1604916911)

Countries of the region present varying degrees of food insecurity. Prevalence varies between an average of 4.9 percent of the total population in Kuwait (2017–2019) and 16.4 percent of the total population in Sudan (FAOSTAT, 2020; Hedeshi and Hartwich, 2020). Similarly, the

prevalence of undernourishment, an indicator of SDG2, varies among the countries, between 2.5 percent of the total population in Kuwait and 23.7 percent of the total population in Iraq (Figure 6).

**Figure 6: Prevalence (%) of undernourishment (three-year average), 2017–2019**

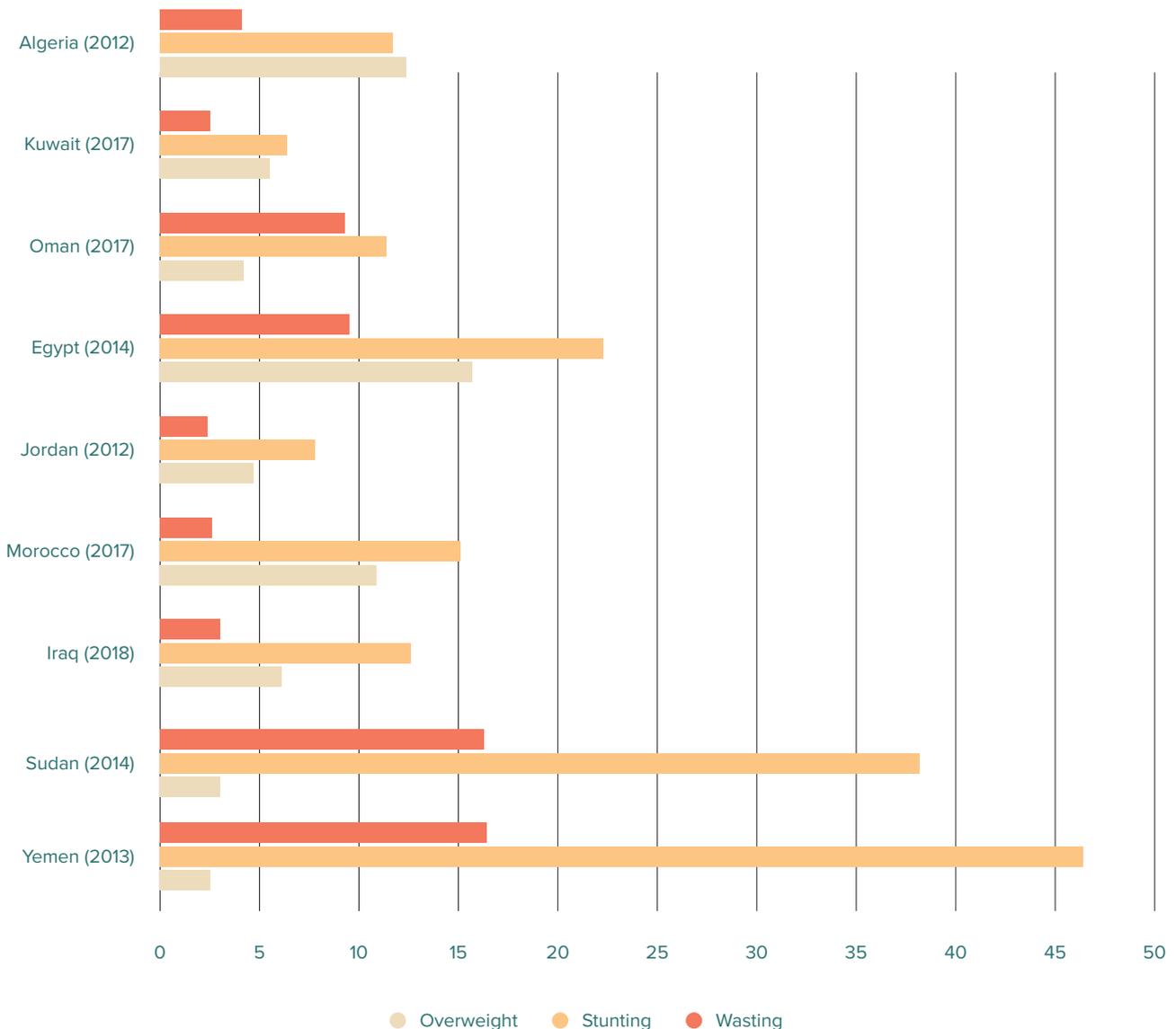


Source: FAOSTAT, 2020

In the context of food security, stunting is a major challenge in the region, followed by overweight. Children under five years of age in the region suffer mainly from stunting, with a prevalence rate higher than 5 percent in all countries where data are available. This rate is more than 30 percent in fragile countries such as Yemen (2013) and Sudan (2014). In both countries, the wasting rate is higher than 15 percent

among children under five. In Egypt (2014), there is the double burden of malnutrition, with a prevalence of both overweight and stunting higher than 15 percent among children under five. The situation is similar for Morocco (2017) and Algeria (2012), where more than 10 percent of children under five years of age are stunted and the same percentage are overweight (Figure 7).

**Figure 7: Percentage of children under five years of age who are stunted, wasted and overweight**



Source: FAOSTAT, 2020

At the micro level, which is the focus of this paper, determinants of food security include individuals' and households' characteristics, as will be explained in more detail in the next section. One key determinant of food security is income level, as poverty and food insecurity are interlinked. Thus, in the context of the shock, the loss of income, decrease in remittances and limited or no access to social protection programmes would increase poverty

and food insecurity. As a result of the shock, the purchasing power of vulnerable groups, including women from these groups, those working in hard-hit sectors, and those receiving remittances or working in the informal sector would decrease, limiting their access to food.

Households will be more dependent on cheap food items and may reduce their consumption of nutritious food

products as a coping mechanism during the pandemic, faced with reduced income. In Egypt, around 73.5 percent of the population declared that their income decreased because of the pandemic. As a result, individuals had to reduce their consumption of meat, chicken, fish and fruits (CAPMAS, 2020).

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### 3. Determinants of poverty and food security in the region

The socio-economic and demographic characteristics of households and heads of household are key determinants of poverty and food security at the household level. These characteristics include sex, education level and employment status of the household's head, size of the household and geographical locations. Access to sanitation services and to clean water are other important determinants of food security through the channel of food utilization and preparation (Mishra and Ray, 2009; Tiwari *et al.*, 2013). In South Africa, households living in rural areas that have low incomes or large households were found to be more likely to be food insecure (Rose and Charlton, 2002). Additionally, Szabo *et al.* (2016) found that education and remittance flows are significant predictors of food insecurity in Bangladesh, using data from the 2010 Household Income and Expenditure Survey and the Soil Resource Development Institute. Thus, as the pandemic affects remittance flows in many of the oil-importing countries, the food security of households dependent on remittances is likely to be under threat.

Poor households are more vulnerable to shocks given their low levels of income and living standards; however, the shock may jeopardize the welfare of all income groups, not only the poor ones. Studying the impact of the shock on poor households only would ignore the potential impact of the crisis on other income groups, where shrinking economic growth and the loss of jobs would limit individuals' ability to generate enough income and access enough food, particularly nutritious food (Aidoo *et al.*, 2013; FAO, 2020c). The United Nations (2020) estimates that some of the newly poor in the region were until recently part of the broadly defined middle class. If their impoverishment is prolonged, this may result in social and political instability.

Given the absence of recent data required to investigate the impact of the shock on poverty and food security through the different channels discussed above, this paper discusses the determinants of vulnerability to loss of income and to food insecurity. Following the literature, income level will be proxied by total expenditure per capita (Ramadan and Thomas, 2011; Ramadan *et al.*, 2018). And as there are no food security indicators reflecting food availability and food utilization in the data sets used, total food expenditure per capita is used as a proxy for food access.

As the economic impact of the shock may differ along the total expenditure distribution, the poor may become poorer and the near poor may fall into poverty. This paper uses the UQR approach to assess the impact of the socio-economic and demographic characteristics of heads of household and the household's characteristics on total expenditure per capita and on food expenditure per capita. UQR allows the potential heterogeneity of socio-economic effects along the expenditure distribution to be examined. UQR has been used to examine the micro-level determinants of poverty (De Silva, 2008) and to study the main determinants of food security indicators such as food expenditure (Mishra *et al.*, 2015) or Body Mass Index in China (Yu *et al.*, 2020). Such an approach is relevant from a policy perspective as it provides policymakers with information regarding the influence of each determinant on the unconditional distribution of the outcome of interest (Kwak, 2010; Mishra *et al.*, 2015; and Yu *et al.*, 2020).

The UQR approach consists of modelling the Recentered Influence Function (RIF) of a given welfare outcome as a function of explanatory variables to estimate the impact of these variables on the unconditional (marginal) distribution of the welfare variable. The conditional expectation of the RIF will be modelled as a linear function of the explanatory variables as follows (Firpo *et al.*, 2009; Ramadan *et al.*, 2018):

$$E[RIF(y, Q_\theta) / X] = X\beta + \varepsilon \quad (1)$$

Where  $RIF(y; Q_\theta / X) = q_\theta + IF(y, q_\theta)$ .

$RIF(y, Q_\theta)$  is the Recentered Influence Function of the  $\theta^{\text{th}}$  quantile of  $y$  estimated by computing the sample quantile  $Q_\theta$  and the density at that point by the Kernel method.  $q_\theta$  is the population  $\theta^{\text{th}}$  quantile of the unconditional distribution of the variable of interest  $y$  and  $IF(y, q_\theta)$  is the influence function (Firpo *et al.*, 2009; Ramadan *et al.*, 2018).

Equation (1) will be estimated two times for each country. First, our dependent variable of interest,  $y$ , is the household's annual total expenditure per capita in logarithmic form (*Model 1*), as a proxy for income level. Second, the dependent variable of interest,  $y$ , will be the annual food expenditure per capita in logarithmic form (*Model 2*), as a proxy for economic access to food.

The regressors,  $X$  vector, include age, sex, education, employment status and industry of employment of the head of household. The impact of the pandemic on the sectors is not uniform. Households whose heads are employed in sectors such as transportation, storage and communication, real estate and administrative activities, and manufacturing, which have been highly impacted by the pandemic (ILO, 2020a), are more likely to lose their income and to decrease their total and food expenditure. Thus, the regressors include the sector of employment to consider the impact of the COVID-19 crisis on the households' total expenditure and food expenditure.

Finally, the regressors include other household characteristics such as dependency ratio, if the household receives remittances or cash transfers from the Government, and geographical location. It is worth noting that the variables included in the models may vary among the countries studied based on data availability.

### 3.1 Data and context

The UQR model is estimated using data for two oil-importing countries (Egypt and Jordan)<sup>5</sup> and two fragile countries (Iraq and Somalia). The choice of these countries is mainly driven by data availability.

#### • Oil-importing countries: Egypt and Jordan

In **Egypt**, the Household Income, Expenditure and Consumption Survey in Egypt (HIECS 2015) includes 11,988 households. Food expenditure represents 48 percent of total expenditure of the lowest decile compared with 25 percent of the highest decile. Female-headed households represent 18 percent of all households, 11 percent of households at the lowest decile and 20 percent at the highest decile (Table 2).

Regarding education level of head of household, more than 50 percent of the lowest decile have no education while only 3.9 percent have finished university or post-graduate degree. For the highest decile, around 15 percent of the

<sup>5</sup> The surveys used for Egypt, Jordan and Somalia are the harmonized household income, expenditure and consumption surveys available at the Economic Research Forum: <http://www.erfdportal.com/index.php/catalog>.

heads of households have no education and more than 40 percent have a university or post-graduate degree (Figure 8). Thus, education is a key determinant of income level in Egypt.

Around 79 percent of the heads of household are employed. This share is 82 percent and 62 percent in the lowest and highest deciles, respectively. As such,

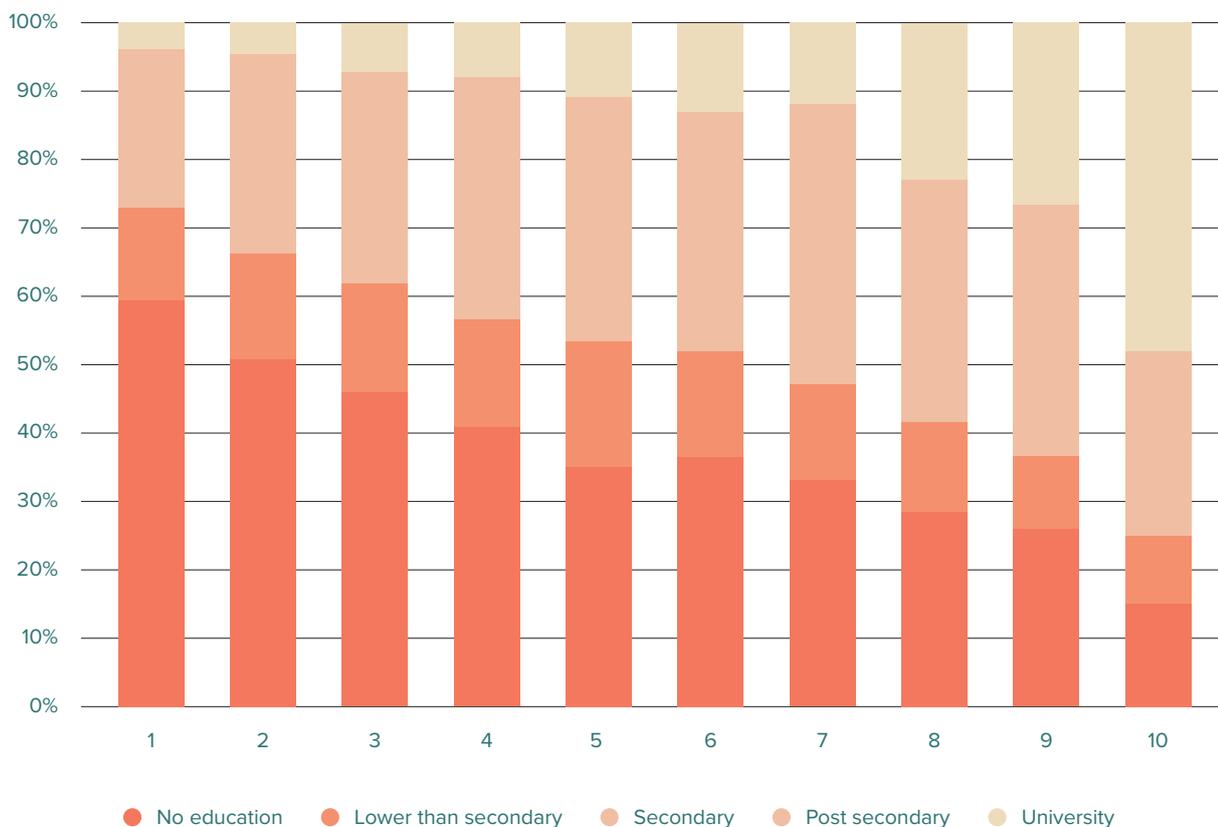
employment is not the main source of income for the highest income group. For female-headed households, 23 percent are employed, and they are mainly concentrated in the agriculture sector, commerce, real estate and other services (Figure 9). These sectors have been hard-hit by the pandemic, meaning that female heads of household working in these sectors are more vulnerable to change in their total expenditure and their food security.

**Table 2: Summary statistics of the households in Egypt (2015)**

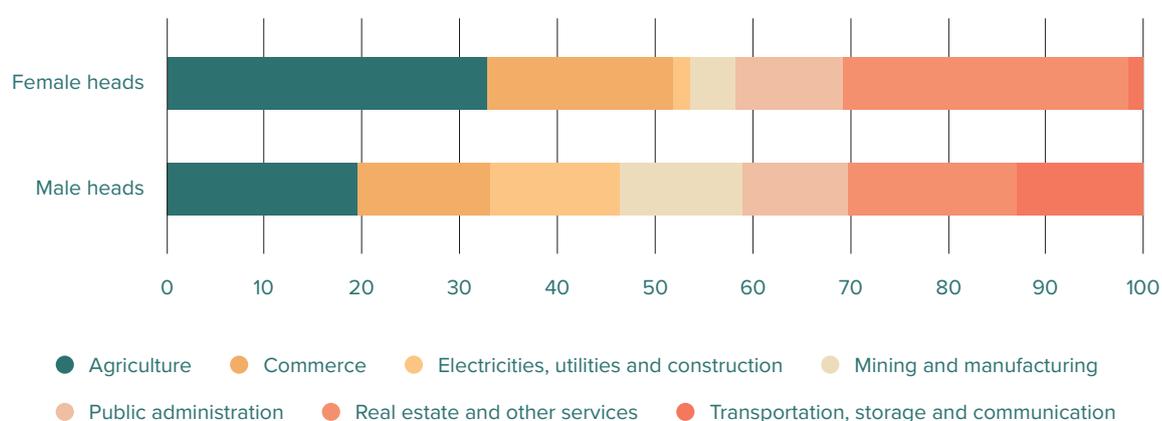
	Total	1	2	3	4	5	6	7	8	9	10
Share of food expenditure	40	48	45	43	42	41	39	38	36	32	25
Share of female-headed households	13	11	9	12	12	11	11	14	14	19	20
Share of employed heads	78	82	85	82	82	82	79	75	76	67	62
Share of households receiving remittances	15	13	7	12	12	13	14	18	19	28	32
Share of households living in urban areas	43	20	28	37	38	45	48	49	55	65	78

Source: author's calculations using HIECS (2015)

**Figure 8: Distribution of heads of household by education and expenditure deciles – Egypt (2015)**



Source: author's calculations using HIECS (2015)

**Figure 9: Distribution (%) of employed heads of household by sector and sex – Egypt (2015)**


Source: author's calculations using HIECS (2015)

Remittances represent a source of income for 13 percent of the households at the lowest expenditure decile, while in the highest decile, 32 percent of the households receive remittances. This means that the higher expenditure groups benefit more from remittances or have better access to opportunities outside Egypt. Similarly, remittances are an important income source for female-headed households, with 55 percent receiving remittances. In terms of geographical location, 43 percent of the households lives in urban areas. This share is 20 percent and 78 percent in the lowest and highest deciles, respectively (Table 2).

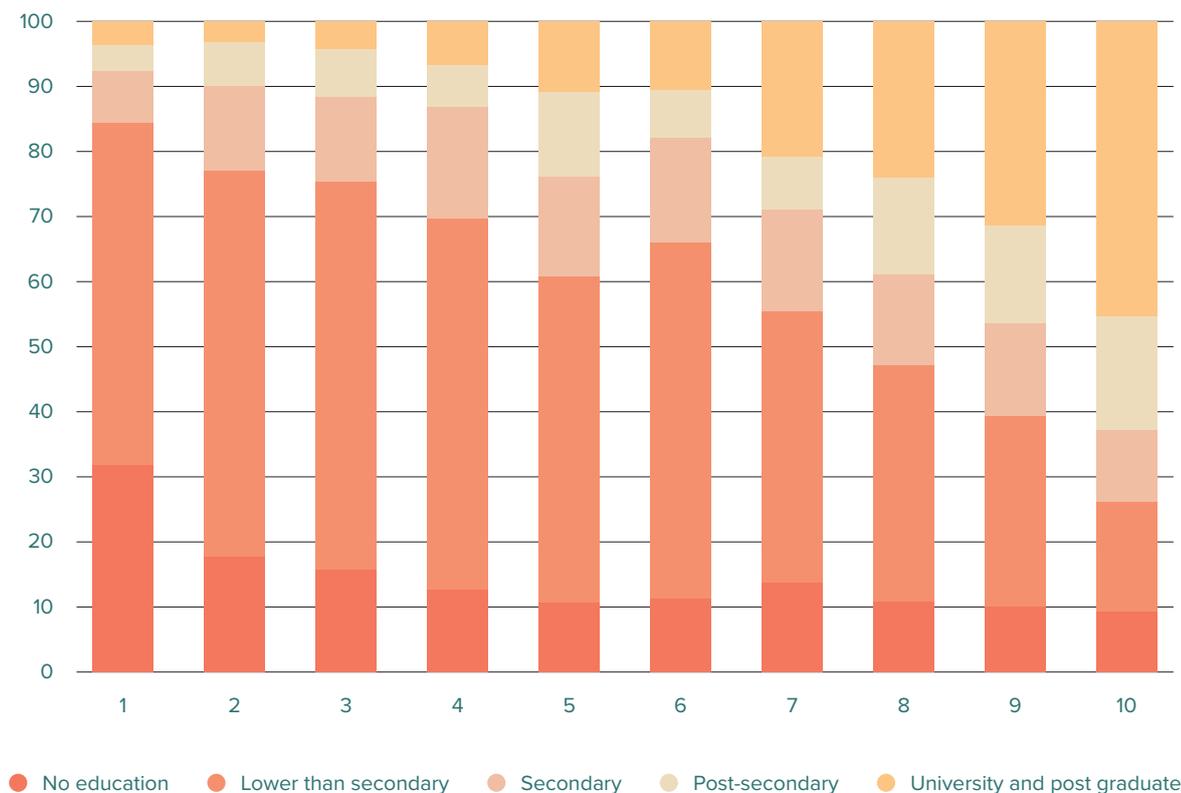
In **Jordan**, the Household Expenditure and Income Survey (HEIS 2013/14) includes 4,850 households. Food expenditure represents 34 percent of total expenditure of the lowest decile and 28 percent of the highest decile. Female-headed households represent 9 percent of the total households: 10 percent of the households in the lowest decile and 14 percent in the highest decile (Table 3). Around 32 percent of the heads of household in the lowest decile have no education and around 4 percent have a university or post-graduate degree. In the highest decile, only 9 percent of the heads of household have no education, while more than 40 percent have post-secondary education or higher (Figure 10).

**Table 3: Summary statistics of the households in Jordan (2013)**

	Total	1	2	3	4	5	6	7	8	9	10
Share of food expenditure	33	34	34	35	34	35	33	33	32	31	28
Share of female-headed households	9	10	8	7	4	11	7	8	7	13	14
Share of employed heads	62	54	66	61	69	68	65	68	58	59	52
Share of households receiving remittances	10	24	9	11	5	8	6	4	7	9	9
Share of households living in urban areas	82	77	81	80	80	79	82	80	83	87	93

Source: author's calculations using HEIS (2013/2014)

**Figure 10: Distribution (%) of heads of household by education and expenditure deciles – Jordan (2013/2014)**

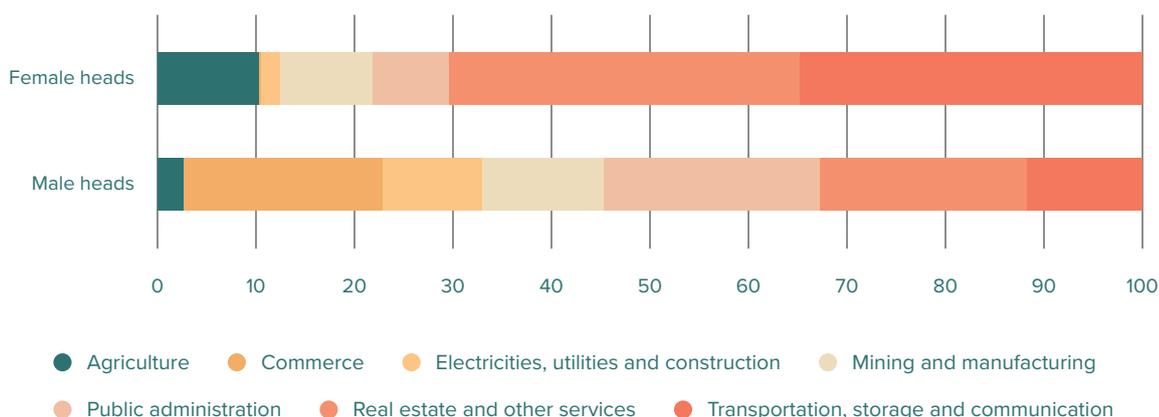


Source: author's calculations using HEIS (2013/2014)

Regarding the employment status of heads of households, 62 percent are employed. This share is 54 percent and 52 percent in the lowest and highest deciles, respectively. Among the female-headed households, only 5 percent

are employed. Most employed women are concentrated in high-risk sectors such as transportation, storage and communication and real estate, which increases their vulnerability to loss of income and poverty (Figure 11).

**Figure 11: Distribution (%) of employed heads of household by sector and sex – Jordan (2013/2014)**



Source: author's calculations using HEIS (2013/2014)

Unlike in Egypt, in Jordan remittances are an important source of income for poor households living in the first income decile, with 24 percent of households receiving income from remittances, while for the highest decile, only 9 percent receives remittances. Similarly, remittances

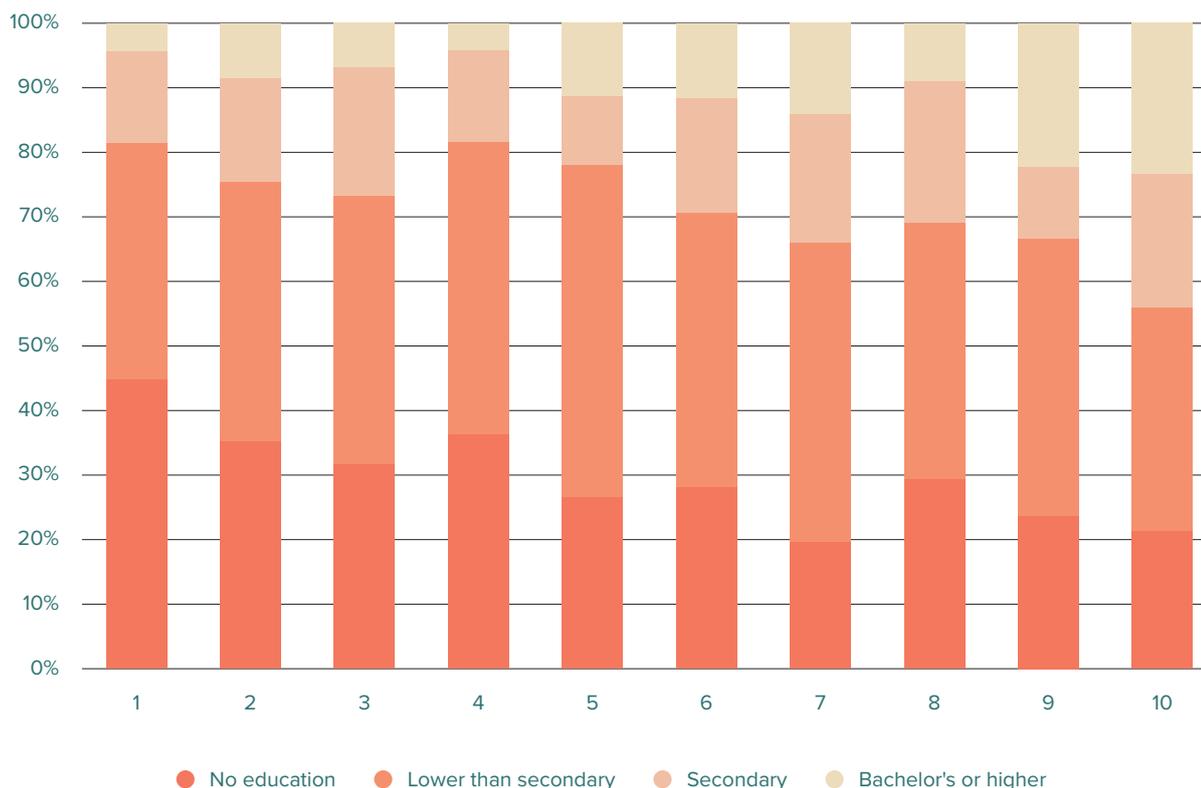
are an important income source for female-headed households, with 37 percent receiving remittances. Regarding geographical location, 82 percent of households live in urban areas. This share is 77 percent and 93 percent in the lowest and highest deciles, respectively (Table 3).

• **Fragile countries: Iraq and Somalia**

In **Iraq**, the Iraq Rapid Welfare Monitoring Survey (SWIFT, 2017) includes 8,618 households. Food expenditure represents 31 percent, 20 percent and 15 percent of total expenditure of all households, households in the lowest decile and households in the highest decile, respectively. Female-headed households represent 9 percent of the

total households. This share is 9 percent in the lowest decile and 7 percent in the highest decile (Table 4). Around 45 percent of heads of household in the lowest decile have no education and only 3 percent have a bachelor's degree or higher. In the highest decile, 21 percent of heads of household have no education and 23 percent have a bachelor's degree or higher (Figure 12).

**Figure 12: Distribution of heads of household by education and expenditure deciles – Iraq (2017)**



Source: author's calculations using SWIFT (2017)

Regarding employment status of heads of households, 73 percent of all heads are employed, with 73 percent and 75 percent in the lowest and highest deciles, respectively. This share is 13 percent for female-headed households. Only 9 percent of households receive cash assistance from the Government. In the lowest decile, 12 percent

of the households receive cash assistance, compared with 5 percent in the highest decile. In Iraq, 73 percent of households live in urban areas. This share is 60 percent and 76 percent in the lowest and highest deciles, respectively (Table 4).

**Table 4: Summary statistics of the households in Iraq (2017)**

	Total	1	2	3	4	5	6	7	8	9	10
Share of food expenditure	31	20	29	35	34	34	39	36	29	29	15
Share of female-headed households	9	9	9	8	19	7	10	5	5	10	7
Share of employed heads	73	73	78	78	65	75	70	72	77	69	75
Share of households receiving cash assistance from Government	9	12	14	12	5	10	11	4	12	2	5
Share of households living in urban areas	73	60	69	60	70	79	75	69	87	85	76

Source: author's calculations using SWIFT (2017)

In **Somalia**, the Somali High Frequency Survey (HFS 2016) includes 4,117 households. Food expenditure represents 52 percent of total expenditure of all households, and 64 percent and 38 percent of total expenditure of the lowest and highest deciles, respectively (Table 5). Female-headed households represent 49 percent of the total households. This share is 43 percent and 48 percent of the households

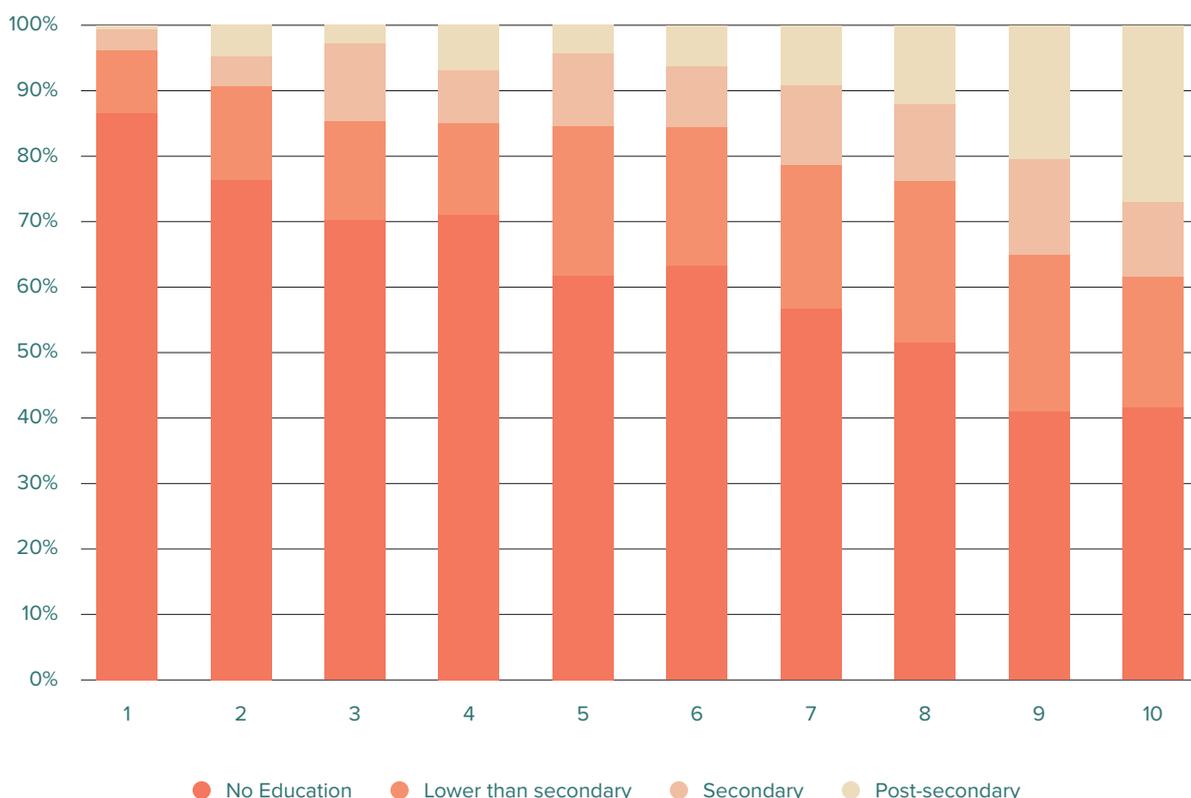
in the lowest and highest deciles, respectively. Around 87 percent and 42 percent of heads of household have no education in the lowest and highest deciles, respectively. In the lowest decile, around 1 percent have a post-secondary degree, while more than 20 percent in the highest decile have received post-secondary education (Figure 13).

**Table 5: Summary statistics of the households in Somalia (2016)**

	Total	1	2	3	4	5	6	7	8	9	10
Share of food expenditure	52	64	55	53	52	50	49	50	47	47	38
Share of female-headed households	49	43	45	51	53	45	54	53	59	47	48
Share of employed heads	17	10	10	12	17	23	19	21	24	27	25
Share of households receiving remittances	26	21	21	27	29	29	25	25	29	28	25
Share of households living in urban areas	67	39	48	60	73	74	79	80	84	83	85

Source: author's calculations using HFS (2016)

**Figure 13: Distribution (%) of heads of household by education and expenditure deciles – Somalia (2016)**



Source: author's calculations using HFS (2016)

In Somalia, only 17 percent of heads of households are employed, mainly in the agriculture sector, real estate and other services. This share is 10 percent and 25 percent in the lowest and highest deciles, respectively. Among the female-headed households, around 10 percent are employed, mainly in agriculture, real estate and transportation, storage and communication (Figure 14). As such, both male and female heads of household are

concentrated in the medium- to high- risk sectors. This increases their vulnerability to loss of income. Additionally, 56 percent of the employed heads of households are employees, 8 percent are employers, 27 percent are self-employed and 9 percent are unpaid family workers.

**Figure 14: Distribution (%) of employed heads of household by sector and sex – Somalia (2016)**

Source: author's calculations using HFS (2016)

Around 26 percent of the households depend on remittances as a source of income. This share is 21 percent among the poorest decile and 25 percent of the richest decile. Remittances represent an important income source for female-headed households, with 32 percent receiving remittances. This means that female-headed households would be more affected by the shock through the remittances channel. Regarding geographical location, 67 percent of households live in urban areas. This share is 39 percent and 85 percent in the lowest and highest deciles, respectively (Table 5).

## 3.2 Estimated results

Both the total expenditure per capita model (Model 1) and the food expenditure per capita model (Model 2) were estimated for Egypt (2015), Jordan (2013), Iraq (2017) and Somalia (2016).

### 3.2.1 Total expenditure per capita models

The results reported in Tables 1 to 4 in Annex I show that the older the head of household, the higher the per capita expenditure for all the deciles in Egypt and Jordan. As shown by Ramadan *et al.* (2018), total expenditure per capita is higher among female-headed households in Egypt, Jordan and Somalia, for all deciles. This is to be expected as more than 50 percent of female-headed households depend on household business, remittances, pensions and other types of assistance as sources of income. These other sources of income, provided mainly to female-headed households to compensate their lower income from employment, may explain the higher expenditure per capita among female-headed households. Accordingly, female-headed households are more likely to be vulnerable to the shock through the remittances channel. Additionally, as found from the raw data, employed female heads in Egypt and Jordan are mainly concentrated

in hard-hit sectors, hence female-headed households risk impoverishment because of the pandemic. In Iraq, there is a relatively low share of female-headed households, and there does not seem to be a significant difference between female-headed households and male-headed households in total expenditure per capita.

Heads of household's education is one of the key determinants of total expenditure per capita in all countries. Heads of household with a higher level of education demonstrate a higher total expenditure per capita. The positive effect of education increases with income deciles. In Egypt, for the first decile, total expenditure per capita is 30 percent higher among households whose heads completed graduate studies, compared with households whose heads are illiterate. For the second and third deciles, which can be considered as vulnerable to poverty, the positive impact of education is higher, as the total expenditure per capita among households whose heads completed graduate studies is 37 percent and 39 percent higher, respectively, compared with households whose heads are illiterate.

In Jordan, for the three lowest deciles, total expenditure per capita in households whose heads completed graduate studies is 59 percent higher, compared with households whose heads are illiterate. Meanwhile, in the highest expenditure group, total expenditure per capita among households whose heads completed graduate studies is more than 100 percent higher, compared with households whose heads are illiterate.

Similarly, for Iraq and Somalia, in the lowest decile, the total expenditure per capita of a household whose head has a bachelor's degree or higher is 29 percent and 46 percent higher, respectively, than a household whose head is illiterate. In the highest decile, the total expenditure per capita of a household whose head has a bachelor's degree or higher is 80 percent and 116 percent higher, respectively, than a household whose head is illiterate.

These results show that education is a significant determinant of expenditure, especially among the higher income groups, as they have access to better resources. Accordingly, education is a key factor in explaining expenditure inequality in the countries of interest. COVID-19 has resulted in disruption to the education systems in these countries, which may increase expenditure inequality. Individuals in low-income groups with a low level of education and limited access to digital resources due to the digital divide are more likely to see their expenditure decrease. Therefore, long-term measures and policies implemented by Governments should ensure equal access to education and combat the digital divide for all individuals, whatever their income level.

For the employment status of heads of households, the variables used differ among countries. In Egypt, only the lowest 40 percent of the expenditure distribution is better off if the head of household is employed. However, in the highest deciles, there is no significant difference between households whose heads are employed and those whose heads are out of the labour force. This may be explained by the availability of income sources other than employment for the highest income groups. In Somalia, in the lowest decile, total expenditure per capita of households whose heads are employed is 12 percent higher than households whose heads are outside the labour force. In the second and third deciles, the impact of heads of household being employed is higher on expenditure—the expenditure per capita of households whose heads are employed is 15 percent and 16 percent higher, respectively, than those whose heads are outside the labour force.

In Iraq, the total expenditure of households whose heads are wage workers is lower compared with households whose heads are unemployed or outside the labour force. In the lowest deciles, having a self-employed head of household increases the household's total expenditure per capita compared with households where heads are unemployed or out of the labour force. As the self-employed, especially those in the informal sector,<sup>6</sup> are among the vulnerable groups affected by the pandemic, poor Iraqi households are expected to be highly impacted and their expenditure would decrease. Similarly, in Jordan, the results show that being an employee, employer or self-employed significantly increases per capita expenditure in the lowest five deciles, compared with heads of household who are unemployed or out of the labour force. Thus, any job loss for heads in poor, nearly poor and middle-class households, because of the pandemic, would jeopardize their welfare and decrease their expenditure.

The industry in which an individual is employed is a key determinant of the impact of the COVID-19 crisis on

expenditure, as some industries such as transportation, storage and communication, real estate and administrative activities, and manufacturing were highly impacted by the pandemic and face a high risk of fall in output. Additionally, those working in the health sector and in the food retail sector are at higher risk of exposure to the COVID-19 virus (ILO, 2020a).

In Egypt and Jordan, where the data on industry of employment are available, the results show that households in the lowest five deciles whose heads work in the agriculture sector have lower total expenditure per capita, compared with those working in real estate and other services. Workers in the agriculture sector are vulnerable to food insecurity and struggle to lift themselves out of poverty (ILO, 2020b). However, the International Labour Organization (ILO) (2020a) categorizes the agriculture sector as one of the sectors considered at low to medium risk. Moreover, in Egypt, households in the two highest expenditure deciles whose heads work in the agriculture sector have higher total expenditure per capita compared with heads working in real estate and other services. This shows that heads of household working in the same sector do not face the same challenges along the expenditure distribution. Similarly, households in the lowest deciles whose heads are employed in the construction sector have lower total expenditure per capita compared with those working in real estate and other services. The total expenditure of these households is expected to be worse off as the construction sector is one of the sectors with a medium risk of fall in output due to the pandemic.

In Egypt, having a head of household employed in the mining and manufacturing sectors increases the total expenditure per capita for all expenditure groups. Heads of household in the highest three expenditure groups who work in commerce and public administration have higher expenditure per capita compared with those working in real estate and other services. However, these sectors—mining, manufacturing, commerce and public administration—are at medium to high risk of falling output because of the pandemic (ILO, 2020a). This means that these households, whose heads work in these high-risk sectors, are susceptible to seeing a decrease in their expenditure.

In Jordan, the expenditure per capita of households in which the head of household is employed in commerce, transportation, storage and communication is lower than the expenditure per capita of those whose heads are employed in real estate and other services. The former sectors are at medium to high risk of seeing a decrease in output because of the pandemic. As such, these already poor households are at further risk of impoverishment.

<sup>6</sup> There is no information about the informality status of employment in the SWIFT (2017).

In Somalia, households in the lowest third decile whose heads are employed in manufacturing and mining, commerce or public administration have a higher total expenditure per capita compared with those working in real estate and other services. For all other deciles, the sector of employment has no significant effect on total expenditure per capita.

Tables (1 to 3) in Annex II show the change in deciles that may result if heads in Egypt, Jordan and Somalia employed in highly affected sectors lost their employment because of the pandemic. The fitted models are used to calculate the estimated expenditure that may result if employed heads in transportation, storage and communication, construction and manufacturing lose their jobs. It was found that several households will fall into a lower expenditure decile when the head become unemployed. It is mainly the lower expenditure deciles, where employment has significant impact, that are subjected to expenditure losses.

In Egypt, households that receive remittances as one source of income have a higher total expenditure per capita compared with those who do not receive remittances, in all expenditure deciles. This positive effect of remittances is greater among the highest deciles. Thus, Egyptian households in higher expenditure deciles are more vulnerable to the shock and the reduction in remittances. On the contrary, in Jordan, where low expenditure deciles are the main beneficiaries of remittances, the total expenditure per capita of households that receive remittances as a source of income is 34 percent lower compared with households that do not receive remittances. Thus, poor and near-poor households are more likely to be worse off as a result of the shock.

As in Egypt, in Somalia, households that receive remittances have a higher total expenditure per capita compared with households that do not receive remittances. Since more than 20 percent of households in all deciles receive remittances as a source of income, households in all expenditure deciles are likely to be negatively affected by the shock, through the remittances channel. However, the low expenditure deciles will be more affected as the expenditure per capita of households that receive remittances in the lowest decile is 8.9 percent higher than for households that do not receive remittances. Meanwhile, in the ninth decile, the expenditure per capita of households that receive remittances is 6.3 percent higher than that of households that do not receive remittances.

Concerning geographical location, households living in urban areas have a higher total expenditure per capita compared with those living in rural areas or refugee camps in all countries. This is to be expected given the centralization of services and all employment opportunities in the urban areas of the region. However, as urban areas became the epicentre of the pandemic, individuals

living in these areas are more likely to be negatively affected by the crisis.

Finally, in Iraq, where data regarding pensions and cash assistance are available, households that receive pensions have a higher total expenditure per capita compared with those that do not. This significant positive effect varies between 25 percent for the third decile and 32 percent for the highest decile. However, households that receive cash assistance from the Government have a lower total expenditure per capita compared with households that do not receive cash assistance. This means that social protection programmes have different impacts on households' welfare in different income groups, based on the type of social programme and other characteristics.

### 3.2.2 Food expenditure per capita models

For the food expenditure per capita models (Tables 5-8 of Annex I), the results show that female-headed households have a higher food expenditure per capita compared with male-headed households. This positive effect is significant for all deciles in Egypt, Jordan and Somalia. This corresponds to the literature showing that when women have decision-making power within the household and have access to resources, they invest more in the food security of their households.

As expected, education is a key determinant for food access. This positive impact can be expected given the positive effect of education on the income level of households. In Egypt, Jordan and Somalia a higher education level significantly increases per capita expenditure for all deciles. While in Iraq, this positive impact is significant only at the highest deciles. As for the household's composition, the results show that households with a higher dependency ratio have lower food expenditure per capita. This negative effect is significant for all deciles in all countries.

In Egypt, households living in urban areas have higher food expenditure per capita compared with their rural counterparts. Similarly, in Iraq and Somalia, living in urban areas increases food expenditure per capita compared with those living in rural areas and refugee camps. Additionally, receiving remittance increases food access in Egypt and Somalia at all deciles. On the contrary, households receiving remittances in Jordan have lower food expenditure per capita. This negative effect is significant only at lower deciles. Social protection programmes have a different impact on food expenditure in Iraq, based on the type of programme. Iraqi households receiving pensions have higher food expenditure per capita compared with those that do not receive pensions, in the highest income deciles. While households receiving cash assistance have

lower food expenditure per capita compared with those who do not receive it.

Finally, to verify the robustness of the modelling, another version of the food expenditure model is estimated using an adult equivalent food expenditure as a dependent variable. The advantage of using the adult equivalent food expenditure is to correct for the economy of scale in consumption and the household's composition (Bellù and Liberarti, 2005). The model includes the same explanatory variables except the dependency ratio variable.<sup>7</sup> The results confirm the findings of the food expenditure per capita models. Households with a female head, whose head has a higher education level have higher equivalent food expenditure. Similarly, receiving remittances and living in urban areas increase adult equivalent food expenditure.

<sup>7</sup> The results are presented in Annex III.





## 4. Government policies to protect the poor and food insecure

The COVID-19 crisis is a health shock as well as an economic shock that has required monetary and fiscal policies to provide support to vulnerable individuals. Compounded by the decrease in oil prices, both oil-exporting and oil-importing countries faced economic slowdowns that limited their fiscal space. In the oil-exporting fragile and conflict-affected countries (FCCs), the effects of the crises are even worse, interacting with the pre-existing dire circumstances. Despite shrinking economies, limited fiscal spaces and decreases in revenues, the Governments in the region have implemented several measures to provide support to the health sector, cushion the negative economic effect of the pandemic on their populations, especially vulnerable groups, and stimulate the economy. Social protection programmes have played a significant role in protecting the poor and vulnerable households.

As found in our analysis, vulnerable groups and individuals are those whose head of household have a low level of education and those working in informal and irregular sectors or hard-hit sectors. The study has also shown that being a beneficiary of social protection affects the magnitude of expenditure per capita. Similarly, the study has shown that the following factors determine the amount of food expenditure per capita (a proxy variable adopted by the study as an indicator of food security): income, receipt of remittances as a source of income, whether the head of household is female and whether the family lives in an urban or rural area. Status of employment is found to be a strong predictor of total expenditure per capita, especially in the lowest four deciles in Egypt and Jordan, and in all deciles in Somalia. In Iraq, it is not a determining factor, probably because the public sector is the predominant employer. Protecting employment is therefore one way of preventing an increase in poverty and food

insecurity. In this regard, supporting businesses, especially micro-, small and medium-sized enterprises, to promote and/or protect employment (thereby protecting a decline in disposable income) and incentivizing enterprises not to let their employees go has been the most common policy response implemented in the four countries. Evidence suggests that sectors are not affected equally; some sectors are more affected than others (high-risk sectors). Those who derive their livelihoods in these high-risk sectors, whether it is the employees or the employers, are at an increased risk of falling into poverty and food insecurity.<sup>8</sup> The findings imply a need for Governments to put in place response mechanisms that protect and/or promote these determinants if increased rates of poverty and food insecurity are to be prevented.

Table 6 below presents policy responses that have been implemented by the four countries studied in this paper, along the critical determinants of total expenditure per capita. As indicated in the table, the depth and breadth of the policy responses put in place seems to depend on the pre-existing conditions, with the evidence presented suggesting that responses from the FCCs were limited in depth and in scope. In the absence of adequate policy responses in the two FCCs, one would expect that poverty and food insecurity in those two countries is likely to get worse, compared with the two countries from oil importing middle-income countries (OIMIC) typology.

<sup>8</sup> Sectors with medium to high risk include: construction; finance and insurance; mining and quarrying; arts, entertainment and recreation, and other services; transportation, storage and communication; accommodation and food services; real estate; business and administrative activities; manufacturing; wholesale and retail trade; and repair of motor vehicles and motorcycles (ILO, 2020a).

**Table 6: Policy responses implemented by the sample countries**

Policies	Egypt	Jordan	Iraq	Somalia
Policies targeting high-risk sectors	Allocation of stimulus package to the tourism sector; postponement of loan repayments; rescheduling taxes and utilities price cut; reduction of the preferential interest rate from 10 percent to 8 percent on loans to tourism, industry, agriculture and construction sectors; provision of real estate tax relief; guarantee on low-interest loans to tourism sector; exemption for restaurants and bazaars in touristic areas from paying rent; a Corona tax of 1 percent to support small and medium-sized enterprises (SMEs).	Authorization for tourism sector to pay its 2019 tax liability in instalments with no penalty; reduction of the general sales tax from 16 percent to 8 percent and of the service tax from 10 percent to 5 percent for hotels and restaurants.		
Policies that promote and protect employment and businesses	Lowering of energy costs for the industrial sector; subsidy pay-out for exporters; aid entitlements for 1,117 exporting firms to sustain labour and input costs; increased credit limits for businesses to support working capital and payment of salaries; provision of short-term loans of up to a year to secure the necessary liquidity for operational expenses.	Postponement of loan repayments; new credit for tourism sector and expansion of the coverage of guarantees on SMEs; reduction of interest rates; increased loan tenors and volume limits; reduction in bank reserve requirement; postponement of 70 percent of the value of customs duties from private companies; re-instituting of a one-year military service to help contain youth unemployment.	Reduction in bank reserve requirement; moratorium on interest and principal payments by SMEs; authorization of banks to extend the maturities of all loans as deemed appropriate.	Initiation by the Central Bank of the release of funding-for-lending support for SMEs.
Policies that expand access to social protection and increase disposable income	Monthly cash transfers to families of irregular workers; increased pensions; extension of targeted cash transfer social programmes, Takaful and Karama; offer of two-year, low-interest consumer loans for citizens; provision of ration card subsidies.	Introduction of price ceilings on essential products; temporary cash transfer programme for the unemployed and self-employed; temporary employment protection schemes covering restaurants; expansion of old-age insurance coverage.	Institution of cash transfer programmes aimed at households of private-sector employees (who did not receive salaries or benefits from the Government); suspension of the collection of levies and other financial dues; suspension of the deductions for loans from the salaries of all state employees.	

Source: IMF, 2020c; Food Security Portal, 2020b

The Food and Agriculture Organization (FAO) generally categorizes policies targeting food security into three categories, namely, consumer-oriented policies, producer-oriented policies and trade-oriented policies (FAO, 2020e). Table 7 summarizes the measures that countries have implemented to address food insecurity with respect to the three dimensions, namely, access to food, availability of food and utilization of food, following the FAO’s categorization of food security-related policy measures.

**Table 7: Food security-related policy responses**

Country	Consumer-related policies	Producer-related policies	Trade-related policies
Egypt	Conditional cash transfers; establishment or modification of food stock (decision to increase strategic food reserves); pension increase; price control (flour and bran prices); food aid and food subsidies.	Financial support for farmers through procurement (fixing the price of the wheat harvest); targeted rural income support (postponed debt repayments for farmers and extension of the moratorium on the tax law on agricultural land).	Ban on export of pulses (IMF, 2020c); change to import tender practices, requiring suppliers to replace any shipments impacted by COVID-19.
Jordan	In-kind food transfers; unconditional cash transfers to vulnerable families, including the elderly; establishment or modification of food stock; postponement of the collection of sales taxes on all domestic sectors; price ceiling on essential products.	Farm income tax; price intervention on staple commodities; Government procurement from domestic farmers.	
Somalia	Tax exemption on some specific basic commodities (including rice); reduced consumption tax (IMF, 2020c).		
Iraq	Conditional cash transfers (emergency grant to Iraqi families impacted by curfew); institutional reform measures; suspension of levies and dues, and suspension of deductions for loans from the salaries of all state employees; exemption of deliveries of food, fuel, medicine and other essentials from movement restrictions during lockdowns and curfews.	Financial support through public banks; institutional measures; transport regulation and infrastructure; measures to strengthen protection for Iraqi agricultural produce.	Import tariffs.

Source: FAO, 2020e; IFPRI (Food Security Portal, 2020b)

As shown above, consumer-oriented policies constitute the largest share of the food security-related policy responses that have been put in place in the four countries. The most common consumer-oriented policies relate to social protection and the most common among the various social protection measures are cash transfers (both conditional and unconditional).

In conclusion, while extensive measures have been put in place, some essential questions remain: to what extent have the adopted policies been effective, who benefited from the interventions and how sustainable are the measures in the event that the crises last longer? For example, a study (UNDP RBAS, 2020) shows that migrants, refugees and internally displaced persons (IDPs) are often excluded from labour market policies and social protection systems in most countries in the region, increasing their vulnerability to external shocks. These questions, however, require detailed surveys and are an important area for future research.



## 5. Concluding remarks and policy recommendations

### 5.1 Conclusions

COVID-19 is expected to jeopardize households' welfare in the Arab States, especially the vulnerable groups. In the absence of recent surveys undertaken following the spread of the pandemic, this paper is an attempt to understand the vulnerabilities and potential economic impacts of the shock on households in the Arab region. The paper overviews the status of poverty and food security in the region before and in the wake of the pandemic, whenever data are available. Using unconditional quantile regression (UQR), the paper investigates the determinants of income (measured by total expenditure per capita) and food security (measured by food expenditure per capita) in two oil-importing countries, Egypt and Jordan, and two fragile countries, Iraq and Somalia.

The results show that education is a key determinant of expenditure level. The higher the education level of the head of household, the better off the household is along the expenditure distribution. Moreover, a higher education level ensures better access to food through the impact of education on income. Additionally, households living in urban areas are better off compared with those living in rural areas or those living in refugee camps. This geographical effect is significant in the lower decile of expenditure distribution. However, with the spread of the pandemic mainly in urban areas, urban populations are at higher risk of a fall in total expenditure and food expenditure.

Head of household's employment is another key determinant of total expenditure per capita, and its impact changes according to the employment sector and the expenditure deciles. The analysis concludes that in Egypt and Jordan, households in the lowest deciles whose heads work in the agriculture

and construction sectors are worse off compared with their counterparts in other sectors. The agriculture sector is crucial to ensuring food security. With the spread of the COVID-19 virus, Governments need to ensure the continuing functioning of this sector to avoid jeopardizing the livelihoods of those working in the sector (ILO, 2020b). In line with ILO recommendations (2020b), Governments also need to coordinate responses to support agribusiness and livelihoods as well as the working conditions of agricultural workers. Similarly, the construction sector, which is fundamental to urban growth in Egypt, has been negatively affected by the pandemic, increasing the vulnerability of households working in this sector to lower income and lower food expenditure (Oxford Business Group, 2020). Such results are relevant from a policy perspective. When implementing measures to mitigate the impact of COVID-19, Governments of the region should not treat all employed individuals equally irrespective of their income group and employment sector. Both the employment sector and the income decile must be considered when social assistance or economic support programmes are implemented.

Women are among the vulnerable groups affected by the shock. As the findings show, employed female heads of households are mainly concentrated in sectors considered to be at medium to high risk such as commerce, real estate, and transportation, storage and communication. Hence, these female-headed households are more vulnerable to income loss and may face challenges in accessing food. Moreover, in Jordan and Somalia, female-headed households depend on remittances as an important source of income. The decrease of remittances in some households resulting from the oil crisis might therefore have threatened the welfare of these households.

As the countries of the region are mainly net food importers, and as food security in the four countries studied may be considered as an economic access challenge, ensuring that households receive enough income would ensure a high level of food expenditure per capita. Additionally, providing more resources for women would empower them and increase food expenditure per capita. As for total expenditure per capita, education is a key determinant of food expenditure per capita, mainly through the positive impact of education on income.

## 5.2 Recommendations

### 5.2.1 Short-term recommendations

Based on the analysis conducted in this paper, the following recommendations could be taken into consideration to mitigate the economic impact of COVID-19. In the short term, Governments could:

- Continue targeted fiscal and financial support to vulnerable groups. As shown in the analysis, the economic impact of the shock is not uniform among households with different socio-economic characteristics and in different income groups. Therefore, financial support should be aimed at individuals based on their income groups, employment status, industry of employment and other socio-economic characteristics such as gender and geographical location.
- Ensure enough income to the households to ensure a high level of food expenditure per capita. As shown in the analysis, the countries of the region are mainly net food importers and food security in the four countries studied may be considered as an economic access challenge. Additionally, providing more resources for women would empower them and increase food expenditure per capita.
- Extend social protection programmes. As the results show, pensions contributed to increase in food expenditure per capita in Iraq. Given the importance of pensions for the well-being of households, countries should consider extending non-contributory pensions to retirees who have worked in the informal sector—particularly those in the lowest income brackets—to reduce the impacts of the crises. The analysis also shows that receiving remittances increases food access in Egypt and Somalia at all income deciles. It is important to ensure that households, including female-headed households, that are negatively impacted by the decline in remittances due to the dual crises are targeted by social protection schemes.
- The analysis has shown that sector of employment and income distribution matters to the level of vulnerability to the impacts of the pandemic. From policy perspectives, such results point to the fact that when implementing measures to mitigate the impact of COVID-19, Governments should not treat all employed individuals in the same manner and consider their income groups and sectors of employment. Both the employment sector and the income deciles have to be considered when social assistance or economic support programmes are designed and implemented. Governments should also consider the need for ensuring continuity in the functioning of those sectors that are at high-risk of suffering from the effects of the pandemic to avoid worsening poverty and food insecurity.

### 5.2.2 *Medium to long-term recommendations*

The actual mitigation measures applied may not be sustained in the long term given the high debt and limited fiscal space that have been aggravated by the shock. Therefore, the following recommendations may be applied in the long term to increase the resilience of the countries to crises and shocks:

- As education is the main contributor to multidimensional poverty in the region, and as shown by the analysis, is a key determinant of income and food security, investing in education and ensuring equal access to education is a necessary condition to reduce poverty and ensure food security. Furthermore, as e-learning becomes a key feature in the new world resulting from the pandemic, there is a significant need to ensure equal access to technologies for all individuals, whatever their income group, gender or geographical location.
- Sustainable investment in decent jobs and working conditions in terms of wages and social protection (ILO, 2020c), especially in medium to high-risk sectors such as manufacturing, real estate, accommodation and food services.
- As women were found to be among the vulnerable groups, policies and measures ensuring equal access to education and to economic opportunities are necessary to increase women's resilience. Providing women with sustainable income sources and decent jobs in the formal sector would empower them and ensure investment in the education and health of future generations.
- The COVID-19 pandemic has shown that services-oriented economies and economies dependent on oil exports are vulnerable to shocks, thus economic diversification through increasing investment in manufacturing, infrastructure, agribusiness and hospital equipment is needed for the region to build resilient economies (Hedeshi and Hartwich, 2020).
- While the pandemic is thought to have affected the urban areas more than rural areas, poverty is primarily a rural phenomenon and investment in the agriculture sector to enhance agricultural productivity, develop agribusiness and promote the production of nutrient-rich foods that contribute to a healthy diet are essential to reduce vulnerability to poverty and food insecurity to future shocks (FAO, 2020d). With the spread of the new virus, the Governments need to ensure the continuing functioning of this sector to avoid jeopardizing the livelihoods of those working in the sector.
- As the findings from the analysis have shown, supplementary sources of income, such as remittances, also matter for poverty reduction and food security. Remittances are an important source of income for households in the Arab region, especially in oil-importing countries. It is important to consider measures that reduce the cost of remittances. It is also essential to expand the use of formal bank accounts among migrants and recipients to promote the use of formal channels for remittance transfers.
- It is also important to develop inclusive and shock-responsive social protection systems; the large gaps in the coverage of vulnerable populations mean that significant reform of existing systems is needed to enable them to become more inclusive and responsive to future shocks.

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# Annex I

**Table 1: Egypt (2015) – Total expenditure per capita model**

Log (Total expenditure per capita)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Head of household's age	0.00682***	0.00794***	0.00919***	0.0102***	0.0108***	0.0122***	0.0135***	0.0138***	0.0159***
	(0.000578)	(0.000473)	(0.000439)	(0.000442)	(0.000460)	(0.000507)	(0.000599)	(0.000699)	(0.000969)
Female head of household	0.0971***	0.103***	0.104***	0.114***	0.133***	0.179***	0.227***	0.246***	0.281***
	(0.0177)	(0.0150)	(0.0144)	(0.0150)	(0.0162)	(0.0184)	(0.0222)	(0.0271)	(0.0397)
Reference education (No education)									
Lower than secondary education	0.109***	0.126***	0.133***	0.132***	0.103***	0.106***	0.128***	0.122***	0.197***
	(0.0211)	(0.0171)	(0.0156)	(0.0153)	(0.0155)	(0.0165)	(0.0189)	(0.0211)	(0.0285)
Secondary education	0.207***	0.207***	0.217***	0.221***	0.220***	0.242***	0.249***	0.256***	0.307***
	(0.0181)	(0.0148)	(0.0133)	(0.0130)	(0.0132)	(0.0141)	(0.0162)	(0.0183)	(0.0245)
Post-secondary education	0.249***	0.286***	0.315***	0.325***	0.318***	0.380***	0.390***	0.388***	0.421***
	(0.0243)	(0.0219)	(0.0216)	(0.0235)	(0.0255)	(0.0293)	(0.0353)	(0.0409)	(0.0553)
Post-university	0.265***	0.316***	0.336***	0.387***	0.431***	0.500***	0.632***	0.681***	0.885***
	(0.0189)	(0.0160)	(0.0155)	(0.0159)	(0.0170)	(0.0192)	(0.0233)	(0.0289)	(0.0454)
Employed	0.0545**	0.0663***	0.0711***	0.0589***	0.0235	0.0233	0.0228	-0.0153	-0.0525
	(0.0258)	(0.0214)	(0.0201)	(0.0206)	(0.0217)	(0.0241)	(0.0281)	(0.0331)	(0.0464)
Unemployed	-0.0939	0.0565	0.0391	0.0502	-0.00697	0.0406	0.0218	-0.00454	0.174
	(0.110)	(0.0742)	(0.0725)	(0.0744)	(0.0756)	(0.0847)	(0.102)	(0.112)	(0.175)
Reference industry (Real estate and other services)									
Agriculture	-0.111***	-0.0879***	-0.0803***	-0.0755***	-0.0369*	-0.00830	0.0211	0.0605**	0.128***
	(0.0280)	(0.0225)	(0.0204)	(0.0199)	(0.0202)	(0.0213)	(0.0237)	(0.0264)	(0.0342)
Mining and manufacturing	0.0933***	0.0931***	0.0667***	0.0528**	0.0557**	0.0716***	0.0608**	0.0545*	0.103***
	(0.0254)	(0.0222)	(0.0213)	(0.0217)	(0.0224)	(0.0240)	(0.0271)	(0.0301)	(0.0397)
Electricity, utilities and construction	-0.0892***	-0.0790***	-0.0853***	-0.0619***	-0.0264	0.000467	0.0393	0.0777***	0.155***
	(0.0313)	(0.0252)	(0.0229)	(0.0220)	(0.0220)	(0.0231)	(0.0260)	(0.0287)	(0.0384)
Commerce	0.0353	0.0224	0.0182	0.0290	0.0563***	0.0787***	0.110***	0.145***	0.185***
	(0.0252)	(0.0217)	(0.0203)	(0.0205)	(0.0212)	(0.0232)	(0.0269)	(0.0313)	(0.0423)
Transportation, storage and communication	0.0538**	0.0460**	0.0224	-0.00980	0.0203	0.0216	0.0435*	0.0637**	0.0862**
	(0.0267)	(0.0231)	(0.0217)	(0.0215)	(0.0219)	(0.0234)	(0.0262)	(0.0296)	(0.0382)
Public administration	0.00780	0.0274	0.0413**	0.0281	0.0178	0.0358	0.0667**	0.0582*	0.0700
	(0.0250)	(0.0213)	(0.0203)	(0.0209)	(0.0225)	(0.0246)	(0.0284)	(0.0325)	(0.0437)
Dependency ratio	-0.355***	-0.371***	-0.382***	-0.401***	-0.403***	-0.372***	-0.349***	-0.277***	-0.140***
	(0.0198)	(0.0164)	(0.0157)	(0.0165)	(0.0179)	(0.0207)	(0.0256)	(0.0318)	(0.0470)
Receiving remittances as income	0.0991***	0.152***	0.166***	0.177***	0.189***	0.227***	0.259***	0.284***	0.268***
	(0.0200)	(0.0164)	(0.0154)	(0.0160)	(0.0169)	(0.0191)	(0.0227)	(0.0266)	(0.0371)
Urban	0.117***	0.137***	0.148***	0.159***	0.170***	0.191***	0.234***	0.257***	0.258***
	(0.0124)	(0.0109)	(0.0104)	(0.0106)	(0.0110)	(0.0121)	(0.0139)	(0.0158)	(0.0208)
Constant	7.546***	7.632***	7.694***	7.767***	7.853***	7.841***	7.849***	7.990***	8.054***

Log (Total expenditure per capita)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	(0.0437)	(0.0354)	(0.0328)	(0.0329)	(0.0343)	(0.0377)	(0.0446)	(0.0527)	(0.0742)
Observations	11,988	11,988	11,988	11,988	11,988	11,988	11,988	11,988	11,988

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 2: Jordan (2013) – Total expenditure per capita model**

Log (Total expenditure per capita)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Head of household's age	0.00791***	0.00885***	0.00799***	0.00891***	0.00937***	0.00970***	0.00984***	0.00950***	0.0119***
	(0.00112)	(0.000881)	(0.000813)	(0.000821)	(0.000881)	(0.000938)	(0.00102)	(0.00117)	(0.00179)
Female head of household	0.319***	0.253***	0.249***	0.293***	0.295***	0.298***	0.311***	0.389***	0.398***
	(0.0406)	(0.0320)	(0.0300)	(0.0299)	(0.0324)	(0.0349)	(0.0389)	(0.0451)	(0.0695)
Reference education (No education)									
Lower than secondary education	0.251***	0.191***	0.138***	0.134***	0.123***	0.0871***	0.0859***	0.105***	0.168***
	(0.0442)	(0.0324)	(0.0289)	(0.0281)	(0.0290)	(0.0301)	(0.0316)	(0.0350)	(0.0514)
Secondary education	0.375***	0.308***	0.256***	0.273***	0.277***	0.238***	0.224***	0.224***	0.300***
	(0.0497)	(0.0389)	(0.0358)	(0.0360)	(0.0377)	(0.0396)	(0.0420)	(0.0454)	(0.0655)
Post-secondary education	0.406***	0.385***	0.337***	0.359***	0.334***	0.367***	0.355***	0.360***	0.424***
	(0.0503)	(0.0414)	(0.0410)	(0.0424)	(0.0461)	(0.0494)	(0.0535)	(0.0605)	(0.0878)
Post-university	0.461***	0.461***	0.459***	0.522***	0.582***	0.618***	0.639***	0.654***	0.903***
	(0.0439)	(0.0346)	(0.0326)	(0.0333)	(0.0364)	(0.0398)	(0.0449)	(0.0535)	(0.0864)
Employee	0.149***	0.117***	0.104***	0.0857**	0.0134	-0.0166	-0.0327	-0.0241	-0.0723
	(0.0421)	(0.0363)	(0.0344)	(0.0349)	(0.0366)	(0.0378)	(0.0393)	(0.0435)	(0.0632)
Employer or self-employed	0.242***	0.165***	0.204***	0.170***	0.0986**	0.0731	0.0521	0.0723	-0.0748
	(0.0551)	(0.0482)	(0.0452)	(0.0461)	(0.0481)	(0.0495)	(0.0526)	(0.0597)	(0.0846)
Reference industry (Real estate and other services)									
Agriculture	-0.472***	-0.316***	-0.223***	-0.180**	-0.150**	-0.132*	-0.0762	-0.0411	0.0880
	(0.124)	(0.0848)	(0.0722)	(0.0713)	(0.0704)	(0.0699)	(0.0712)	(0.0789)	(0.112)
Mining and manufacturing	-0.0237	0.0479	0.000912	-0.00189	0.0175	0.0325	-0.0123	-0.00840	-0.0390
	(0.0552)	(0.0470)	(0.0468)	(0.0482)	(0.0498)	(0.0510)	(0.0521)	(0.0564)	(0.0732)
Electricity, utilities and construction	-0.195**	-0.109*	-0.133**	-0.0977*	0.0305	0.00781	0.0144	0.000657	-0.0490
	(0.0786)	(0.0606)	(0.0557)	(0.0550)	(0.0569)	(0.0571)	(0.0592)	(0.0622)	(0.0786)
Commerce	-0.0617	-0.0315	-0.0735*	-0.0635	-0.0223	0.0109	0.0114	-0.0232	0.0536
	(0.0513)	(0.0446)	(0.0423)	(0.0429)	(0.0446)	(0.0454)	(0.0475)	(0.0514)	(0.0734)
Transportation, storage and communication	-0.0922	-0.0450	-0.0632	-0.145***	-0.0864*	-0.0994**	-0.0667	-0.0523	-0.0416
	(0.0612)	(0.0512)	(0.0488)	(0.0496)	(0.0505)	(0.0500)	(0.0515)	(0.0549)	(0.0741)
Public administration	0.0619	0.0792**	0.113***	0.115***	0.151***	0.150***	0.116***	0.0712	0.0614
	(0.0413)	(0.0366)	(0.0343)	(0.0355)	(0.0379)	(0.0390)	(0.0406)	(0.0435)	(0.0614)
Dependency ratio	-0.453***	-0.446***	-0.425***	-0.415***	-0.425***	-0.403***	-0.364***	-0.227***	-0.136
	(0.0420)	(0.0354)	(0.0338)	(0.0350)	(0.0387)	(0.0423)	(0.0471)	(0.0553)	(0.0846)

Log (Total expenditure per capita)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Receiving remittances as income	-0.296***	-0.171***	-0.148***	-0.115***	-0.130***	-0.0991***	-0.0406	-0.0341	-0.00380
	(0.0511)	(0.0367)	(0.0324)	(0.0315)	(0.0328)	(0.0342)	(0.0366)	(0.0416)	(0.0620)
Urban	0.0666**	0.0293	0.0355*	0.0389*	0.0432**	0.0527**	0.0761***	0.0999***	0.143***
	(0.0260)	(0.0209)	(0.0197)	(0.0198)	(0.0208)	(0.0215)	(0.0224)	(0.0237)	(0.0318)
Constant	6.036***	6.271***	6.492***	6.575***	6.710***	6.857***	6.984***	7.103***	7.164***
	(0.0887)	(0.0676)	(0.0609)	(0.0605)	(0.0641)	(0.0680)	(0.0738)	(0.0846)	(0.133)
Observations	4,850	4,850	4,850	4,850	4,850	4,850	4,850	4,850	4,850

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 3: Iraq (2017) – Total expenditure per capita model**

Log (Total expenditure per capita)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Head of household's age	0.00794*	0.00196	-0.000334	-0.00219	-0.00309	-0.00307	-0.00438*	-0.00259	-0.00138
	(0.00436)	(0.00313)	(0.00281)	(0.00268)	(0.00259)	(0.00251)	(0.00266)	(0.00306)	(0.00441)
Female head of household	0.0299	-0.0750	0.00181	0.0230	0.0176	-0.0132	0.0711	0.137	0.0445
	(0.180)	(0.126)	(0.114)	(0.107)	(0.101)	(0.102)	(0.110)	(0.130)	(0.177)
Reference education (No education)									
Lower than secondary education	0.320***	0.208***	0.160**	0.134**	0.120*	0.0786	0.00132	0.0654	8.66e-05
	(0.114)	(0.0803)	(0.0724)	(0.0680)	(0.0643)	(0.0633)	(0.0660)	(0.0734)	(0.0952)
Secondary education	0.0683	0.0408	-0.0477	-0.00407	0.0539	0.0537	0.0448	0.0110	0.224
	(0.145)	(0.105)	(0.0969)	(0.0904)	(0.0862)	(0.0860)	(0.0907)	(0.0990)	(0.142)
Bachelor's degree or higher	0.256*	0.183*	0.219**	0.319***	0.275***	0.323***	0.360***	0.484***	0.586***
	(0.144)	(0.110)	(0.0981)	(0.0946)	(0.0966)	(0.0997)	(0.111)	(0.133)	(0.194)
Wage worker	0.171	-0.142	-0.141	-0.211	-0.220	-0.251*	-0.243	-0.430**	-0.412*
	(0.262)	(0.191)	(0.176)	(0.164)	(0.153)	(0.151)	(0.152)	(0.168)	(0.231)
Self-employed or unpaid family worker	0.415**	-0.00770	-0.0500	-0.0298	-0.0356	-0.0895	-0.0650	-0.136	-0.108
	(0.200)	(0.154)	(0.144)	(0.134)	(0.123)	(0.117)	(0.121)	(0.129)	(0.168)
Working in public sector	0.267	0.317*	0.443***	0.546***	0.517***	0.518***	0.420***	0.637***	0.607***
	(0.227)	(0.174)	(0.161)	(0.151)	(0.141)	(0.139)	(0.138)	(0.149)	(0.203)
Working in private sector	-0.276	-0.0513	0.0138	0.127	0.141	0.168	0.175	0.274**	0.311*
	(0.197)	(0.155)	(0.143)	(0.132)	(0.123)	(0.120)	(0.120)	(0.129)	(0.175)
Dependency ratio	-1.215***	-0.887***	-0.877***	-0.942***	-0.932***	-0.862***	-0.901***	-0.782***	-0.479**
	(0.182)	(0.131)	(0.122)	(0.115)	(0.114)	(0.117)	(0.128)	(0.150)	(0.230)
One earner in the household	0.0452	-0.0330	0.0123	-0.0287	0.0124	0.0230	0.00738	-0.0186	-0.0298
	(0.0896)	(0.0674)	(0.0647)	(0.0616)	(0.0594)	(0.0588)	(0.0620)	(0.0723)	(0.0941)
Urban	0.321***	0.237***	0.326***	0.305***	0.217***	0.228***	0.275***	0.162**	0.117
	(0.116)	(0.0816)	(0.0738)	(0.0674)	(0.0625)	(0.0610)	(0.0611)	(0.0695)	(0.0943)
Receiving cash assistance	-0.374*	-0.332**	-0.310**	-0.179*	-0.208**	-0.177*	-0.150	-0.280***	-0.0997
	(0.201)	(0.137)	(0.121)	(0.108)	(0.0982)	(0.0927)	(0.0952)	(0.0933)	(0.142)
Receiving pensions	0.0121	0.0234	0.223***	0.222***	0.310***	0.297***	0.241***	0.222**	0.278**

Log (Total expenditure per capita)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	(0.123)	(0.0888)	(0.0792)	(0.0756)	(0.0725)	(0.0733)	(0.0767)	(0.0871)	(0.120)
Constant	12.60***	13.47***	13.70***	14.02***	14.31***	14.51***	14.83***	15.07***	15.27***
	(0.344)	(0.229)	(0.202)	(0.188)	(0.182)	(0.180)	(0.191)	(0.221)	(0.327)
Observations	1,491	1,491	1,491	1,491	1,491	1,491	1,491	1,491	1,491

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 4: Somalia (2016) – Total expenditure per capita model**

Log (Total expenditure per capita)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Head of household's age	9.40e-05	-0.00137	-0.00240*	-0.00240**	-0.00281**	-0.00135	-0.00132	-0.000100	0.00144
	(0.00169)	(0.00140)	(0.00128)	(0.00120)	(0.00121)	(0.00114)	(0.00112)	(0.00128)	(0.00170)
Female head of household	0.223***	0.245***	0.219***	0.206***	0.225***	0.192***	0.178***	0.165***	0.177***
	(0.0524)	(0.0411)	(0.0356)	(0.0327)	(0.0322)	(0.0302)	(0.0295)	(0.0327)	(0.0398)
Reference education (No education)									
Lower than secondary education	0.347***	0.362***	0.328***	0.294***	0.255***	0.219***	0.213***	0.160***	0.145***
	(0.0488)	(0.0434)	(0.0405)	(0.0386)	(0.0389)	(0.0374)	(0.0371)	(0.0402)	(0.0492)
Secondary education	0.345***	0.391***	0.371***	0.371***	0.341***	0.332***	0.277***	0.268***	0.229***
	(0.0514)	(0.0487)	(0.0472)	(0.0468)	(0.0481)	(0.0474)	(0.0489)	(0.0555)	(0.0666)
Post-secondary education	0.379***	0.419***	0.458***	0.491***	0.593***	0.618***	0.625***	0.708***	0.771***
	(0.0403)	(0.0447)	(0.0434)	(0.0446)	(0.0479)	(0.0501)	(0.0554)	(0.0692)	(0.0973)
Employed	0.112*	0.144**	0.152***	0.177***	0.146***	0.120**	0.151***	0.199***	0.142**
	(0.0655)	(0.0581)	(0.0525)	(0.0502)	(0.0506)	(0.0483)	(0.0486)	(0.0551)	(0.0695)
Unemployed	-0.0895	-0.0544	0.0119	0.0683**	0.0696**	0.0548*	0.0439	0.0525	-0.0372
	(0.0562)	(0.0438)	(0.0379)	(0.0348)	(0.0342)	(0.0326)	(0.0315)	(0.0348)	(0.0412)
Reference industry (Real estate and other services)									
Agriculture	0.0816	0.0557	0.197	0.103	0.0749	0.0406	-0.0620	-0.101	-0.0365
	(0.190)	(0.143)	(0.120)	(0.109)	(0.107)	(0.0965)	(0.0931)	(0.104)	(0.140)
Mining and manufacturing	0.283	0.331	0.377*	0.297	0.0298	0.220	0.371*	0.348	0.271
	(0.252)	(0.242)	(0.206)	(0.191)	(0.198)	(0.185)	(0.193)	(0.253)	(0.333)
Electricity, utilities and construction	-0.244	-0.125	-0.0617	-0.0316	-0.00673	0.0431	0.0947	-0.193	-0.195
	(0.198)	(0.147)	(0.113)	(0.110)	(0.118)	(0.114)	(0.125)	(0.131)	(0.160)
Commerce	0.00895	0.0942	0.272**	0.0971	0.245	0.147	0.0324	-0.0994	-0.0694
	(0.185)	(0.158)	(0.127)	(0.150)	(0.151)	(0.166)	(0.154)	(0.177)	(0.228)
Transportation, storage and communication	0.0594	0.0713	0.165	0.123	-0.00150	0.107	0.110	0.104	0.0432
	(0.117)	(0.119)	(0.111)	(0.118)	(0.132)	(0.133)	(0.136)	(0.161)	(0.197)
Public administration	0.131	0.160	0.175*	0.00668	0.0727	0.0934	0.106	0.234	0.196
	(0.0822)	(0.103)	(0.0984)	(0.113)	(0.110)	(0.124)	(0.141)	(0.174)	(0.249)
Dependency ratio	-0.556***	-0.737***	-0.769***	-0.929***	-0.951***	-0.963***	-0.971***	-1.060***	-1.117***
	(0.0762)	(0.0619)	(0.0558)	(0.0522)	(0.0528)	(0.0510)	(0.0519)	(0.0600)	(0.0821)

Log (Total expenditure per capita)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Receiving remittances as income	0.0858*	0.0843**	0.0721**	0.0670**	0.0596*	0.0827***	0.0870***	0.0613*	0.0481
	(0.0450)	(0.0383)	(0.0347)	(0.0326)	(0.0321)	(0.0307)	(0.0302)	(0.0330)	(0.0408)
Urban	0.781***	0.711***	0.641***	0.571***	0.487***	0.381***	0.293***	0.200***	0.0937***
	(0.0581)	(0.0452)	(0.0382)	(0.0338)	(0.0315)	(0.0282)	(0.0263)	(0.0283)	(0.0339)
Constant	5.135***	5.652***	6.005***	6.329***	6.607***	6.852***	7.100***	7.386***	7.764***
	(0.103)	(0.0827)	(0.0732)	(0.0685)	(0.0684)	(0.0645)	(0.0649)	(0.0742)	(0.0975)
Observations	4,062	4,062	4,062	4,062	4,062	4,062	4,062	4,062	4,062

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 5: Egypt (2015) – Food expenditure per capita model**

Log (food expenditure per capita)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Head of household's age	0.00491***	0.00614***	0.00662***	0.00742***	0.00858***	0.00964***	0.0104***	0.0110***	0.0141***
	(0.000505)	(0.000430)	(0.000393)	(0.000395)	(0.000404)	(0.000444)	(0.000495)	(0.000582)	(0.000793)
Female head of household	0.102***	0.120***	0.133***	0.141***	0.153***	0.176***	0.216***	0.252***	0.381***
	(0.0163)	(0.0139)	(0.0130)	(0.0132)	(0.0140)	(0.0159)	(0.0183)	(0.0225)	(0.0326)
Education (Reference: illiterate)									
Lower than secondary education	0.0630***	0.0713***	0.0689***	0.0777***	0.0709***	0.0638***	0.0518***	0.0404**	0.0696***
	(0.0197)	(0.0163)	(0.0145)	(0.0140)	(0.0139)	(0.0146)	(0.0154)	(0.0173)	(0.0228)
Secondary education	0.171***	0.174***	0.162***	0.146***	0.141***	0.147***	0.148***	0.114***	0.122***
	(0.0166)	(0.0139)	(0.0126)	(0.0121)	(0.0119)	(0.0126)	(0.0134)	(0.0147)	(0.0188)
Post-secondary education	0.180***	0.207***	0.201***	0.214***	0.225***	0.209***	0.200***	0.164***	0.182***
	(0.0263)	(0.0231)	(0.0221)	(0.0222)	(0.0230)	(0.0251)	(0.0277)	(0.0307)	(0.0401)
Post-university	0.232***	0.255***	0.280***	0.294***	0.298***	0.326***	0.327***	0.342***	0.347***
	(0.0182)	(0.0161)	(0.0149)	(0.0149)	(0.0156)	(0.0174)	(0.0195)	(0.0231)	(0.0321)
Employment status (Reference: out of labour force)									
Employed	0.0381	0.0325	0.0151	0.0180	0.0244	0.0156	-0.00471	-0.0129	0.0412
	(0.0239)	(0.0206)	(0.0190)	(0.0190)	(0.0194)	(0.0211)	(0.0233)	(0.0269)	(0.0347)
Unemployed	-0.0494	-0.113	-0.108	-0.115*	-0.106*	-0.123*	-0.0843	-0.0382	-0.0268
	(0.0936)	(0.0811)	(0.0708)	(0.0650)	(0.0639)	(0.0644)	(0.0724)	(0.0849)	(0.111)
Industry (Reference: real estate and other services)									
Agriculture	-2.33e-05	0.0123	0.0472**	0.0465**	0.0535***	0.0651***	0.0961***	0.0936***	0.0701**
	(0.0241)	(0.0205)	(0.0186)	(0.0182)	(0.0181)	(0.0191)	(0.0201)	(0.0221)	(0.0274)
Mining and manufacturing	0.0706***	0.0351	0.0454**	0.0509**	0.0556***	0.0537**	0.0672***	0.0774***	0.0693**
	(0.0245)	(0.0220)	(0.0203)	(0.0200)	(0.0200)	(0.0210)	(0.0219)	(0.0237)	(0.0284)
Electricity, utilities and construction	-0.0816***	-0.0752***	-0.0650***	-0.0464**	-0.0122	-0.00368	0.0256	0.0489**	0.0766***
	(0.0291)	(0.0238)	(0.0212)	(0.0202)	(0.0198)	(0.0203)	(0.0209)	(0.0223)	(0.0276)
Commerce	0.0218	-0.00135	0.0204	0.0253	0.0327*	0.0579***	0.0956***	0.0976***	0.0855***
	(0.0240)	(0.0210)	(0.0193)	(0.0191)	(0.0191)	(0.0203)	(0.0218)	(0.0242)	(0.0302)
Transportation, storage and communication	-0.0271	0.00627	0.0229	0.0186	0.0199	0.0337	0.0502**	0.0511**	0.0531*

Log (food expenditure per capita)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	(0.0272)	(0.0224)	(0.0206)	(0.0202)	(0.0199)	(0.0209)	(0.0217)	(0.0229)	(0.0274)
Public administration	-0.00223	0.00221	0.0224	0.0268	0.0356*	0.0248	0.0510**	0.0696***	0.0297
	(0.0241)	(0.0210)	(0.0197)	(0.0197)	(0.0200)	(0.0215)	(0.0228)	(0.0253)	(0.0305)
Dependency ratio	-0.225***	-0.237***	-0.227***	-0.244***	-0.246***	-0.237***	-0.192***	-0.102***	0.110***
	(0.0178)	(0.0150)	(0.0141)	(0.0144)	(0.0152)	(0.0175)	(0.0204)	(0.0256)	(0.0386)
Receiving remittances as income	0.0976***	0.103***	0.118***	0.147***	0.176***	0.201***	0.224***	0.277***	0.297***
	(0.0179)	(0.0155)	(0.0142)	(0.0143)	(0.0148)	(0.0165)	(0.0187)	(0.0222)	(0.0297)
Living in urban areas	0.0165	0.0337***	0.0365***	0.0439***	0.0579***	0.0752***	0.0965***	0.111***	0.117***
	(0.0120)	(0.0104)	(0.00960)	(0.00953)	(0.00965)	(0.0104)	(0.0112)	(0.0126)	(0.0163)
Constant	6.813***	6.907***	6.994***	7.053***	7.071***	7.103***	7.148***	7.224***	7.140***
	(0.0388)	(0.0329)	(0.0297)	(0.0295)	(0.0300)	(0.0328)	(0.0368)	(0.0438)	(0.0602)
Observations	11,983	11,983	11,983	11,983	11,983	11,983	11,983	11,983	11,983

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 6: Jordan (2014) – Food expenditure per capita model**

Log (food expenditure per capita)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Head of household's age	0.00850***	0.00843***	0.00809***	0.00817***	0.00851***	0.00911***	0.00940***	0.0107***	0.0108***
	(0.00139)	(0.00111)	(0.00101)	(0.000991)	(0.00101)	(0.00105)	(0.00116)	(0.00142)	(0.00176)
Female head of household	0.159***	0.177***	0.183***	0.250***	0.254***	0.257***	0.306***	0.344***	0.366***
	(0.0488)	(0.0392)	(0.0355)	(0.0347)	(0.0360)	(0.0383)	(0.0431)	(0.0539)	(0.0704)
Education (Reference: illiterate)									
Lower than secondary education	0.147***	0.149***	0.119***	0.102***	0.0818**	0.0803**	0.0679*	0.102**	0.1000*
	(0.0483)	(0.0377)	(0.0334)	(0.0320)	(0.0319)	(0.0326)	(0.0356)	(0.0416)	(0.0532)
Secondary education	0.211***	0.213***	0.230***	0.217***	0.174***	0.130***	0.133***	0.175***	0.165**
	(0.0579)	(0.0470)	(0.0419)	(0.0410)	(0.0414)	(0.0420)	(0.0454)	(0.0528)	(0.0647)
Post-secondary education	0.303***	0.322***	0.266***	0.262***	0.244***	0.201***	0.133**	0.194***	0.173**
	(0.0603)	(0.0510)	(0.0494)	(0.0497)	(0.0512)	(0.0527)	(0.0564)	(0.0658)	(0.0784)
Post-university	0.352***	0.427***	0.429***	0.432***	0.465***	0.457***	0.471***	0.517***	0.516***
	(0.0499)	(0.0418)	(0.0394)	(0.0404)	(0.0415)	(0.0444)	(0.0500)	(0.0617)	(0.0803)
Employment status (Reference: out of labour force)									
Employed	0.181***	0.0994**	0.0630	0.0423	0.00619	-0.00870	-0.00308	-0.0467	-0.0995
	(0.0506)	(0.0451)	(0.0429)	(0.0432)	(0.0434)	(0.0441)	(0.0478)	(0.0556)	(0.0652)
Unemployed	-0.130*	-0.133**	-0.157***	-0.192***	-0.186***	-0.223***	-0.201***	-0.218***	-0.201***
	(0.0755)	(0.0575)	(0.0505)	(0.0472)	(0.0454)	(0.0436)	(0.0454)	(0.0495)	(0.0561)
Industry (Reference: real estate and other services)									
Agriculture	-0.319**	-0.195**	-0.166**	-0.150*	-0.126	-0.0868	-0.0723	0.0107	0.0285
	(0.126)	(0.0948)	(0.0841)	(0.0800)	(0.0781)	(0.0781)	(0.0829)	(0.0936)	(0.104)
Mining and manufacturing	-0.0717	-0.0291	0.00105	-0.0281	0.0294	-0.0166	-0.0844	-0.0816	0.00368

Log (food expenditure per capita)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	(0.0659)	(0.0585)	(0.0551)	(0.0554)	(0.0554)	(0.0555)	(0.0575)	(0.0628)	(0.0701)
Electricity, utilities and construction	-0.221**	-0.244***	-0.205***	-0.122*	-0.0943	-0.111*	-0.140**	-0.0289	-0.0281
	(0.0899)	(0.0752)	(0.0662)	(0.0631)	(0.0605)	(0.0602)	(0.0609)	(0.0717)	(0.0731)
Commerce	-0.105*	-0.0784	-0.0787	-0.0753	-0.0535	-0.0526	-0.0364	-0.0368	0.0534
	(0.0568)	(0.0518)	(0.0488)	(0.0483)	(0.0478)	(0.0478)	(0.0510)	(0.0577)	(0.0648)
Transportation, storage and communication	-0.238***	-0.156**	-0.124**	-0.0637	-0.109**	-0.162***	-0.185***	-0.112*	-0.0346
	(0.0771)	(0.0636)	(0.0576)	(0.0563)	(0.0545)	(0.0527)	(0.0538)	(0.0614)	(0.0673)
Public administration	-0.0234	0.0446	0.0396	0.0694*	0.0968**	0.0847**	0.0363	0.0433	0.0716
	(0.0468)	(0.0425)	(0.0411)	(0.0414)	(0.0418)	(0.0427)	(0.0459)	(0.0520)	(0.0565)
Dependency ratio	-0.281***	-0.281***	-0.274***	-0.284***	-0.274***	-0.285***	-0.248***	-0.207***	-0.114
	(0.0537)	(0.0431)	(0.0398)	(0.0399)	(0.0412)	(0.0437)	(0.0494)	(0.0621)	(0.0820)
Receiving remittances as income	-0.131**	-0.140***	-0.0890**	-0.0653*	-0.0376	-0.0900**	-0.0586	-0.0175	0.0384
	(0.0550)	(0.0430)	(0.0372)	(0.0354)	(0.0353)	(0.0356)	(0.0393)	(0.0481)	(0.0621)
Urban	-0.00134	-0.0229	-0.0264	-0.0232	-0.0405*	-0.0376	-0.0249	0.00152	0.00477
	(0.0300)	(0.0247)	(0.0229)	(0.0225)	(0.0225)	(0.0230)	(0.0246)	(0.0281)	(0.0326)
Constant	4.929***	5.208***	5.432***	5.586***	5.749***	5.907***	6.046***	6.135***	6.377***
	(0.109)	(0.0853)	(0.0767)	(0.0746)	(0.0760)	(0.0791)	(0.0871)	(0.106)	(0.135)
Observations	4,849	4,849	4,849	4,849	4,849	4,849	4,849	4,849	4,849

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 7: Iraq (2017) – Food expenditure per capita model**

Log (food expenditure per capita)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Head of household's age	-0.00365	-0.00967	-0.00152	0.000192	-0.000863	-0.000654	-0.00215	-0.00106	0.00116
	(0.00767)	(0.0152)	(0.0162)	(0.00461)	(0.00386)	(0.00353)	(0.00333)	(0.00301)	(0.00266)
Female head of household	-0.0786	0.488	-0.651	-0.155	0.0812	0.126	0.0655	0.136	0.208
	(0.321)	(0.579)	(0.657)	(0.188)	(0.158)	(0.142)	(0.139)	(0.137)	(0.127)
Education (Reference: illiterate)									
Lower than secondary education	0.314	0.473	-0.553	-0.123	-0.0654	-0.00520	-0.0948	-0.0788	-0.00996
	(0.201)	(0.381)	(0.398)	(0.115)	(0.0977)	(0.0883)	(0.0814)	(0.0743)	(0.0645)
Secondary education	0.240	-0.0582	-1.343**	-0.432***	-0.360***	-0.202*	-0.114	-0.0879	-0.0118
	(0.249)	(0.505)	(0.538)	(0.153)	(0.127)	(0.116)	(0.111)	(0.101)	(0.0902)
Bachelor's degree or higher	0.368	0.310	-1.238**	-0.198	0.0651	0.242*	0.202	0.226*	0.247**
	(0.261)	(0.564)	(0.620)	(0.174)	(0.146)	(0.137)	(0.133)	(0.131)	(0.125)
Employment (Reference: unemployed or out of labour force)									

Log (food expenditure per capita)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Wage workers	-0.0213 (0.417)	-0.0401 (0.904)	0.517 (0.950)	0.0794 (0.278)	0.0515 (0.233)	-0.0709 (0.204)	-0.0974 (0.188)	-0.176 (0.174)	-0.274** (0.120)
Self-employed or unpaid workers	0.457 (0.330)	-0.651 (0.762)	-0.431 (0.773)	-0.0606 (0.227)	-0.0931 (0.189)	-0.111 (0.164)	-0.101 (0.146)	-0.135 (0.130)	-0.189** (0.0865)
Public sector	0.263 (0.373)	0.463 (0.846)	-0.404 (0.874)	0.236 (0.254)	0.283 (0.215)	0.450** (0.189)	0.411** (0.174)	0.350** (0.158)	0.426*** (0.114)
Private sector	-0.286 (0.318)	0.345 (0.758)	-0.772 (0.772)	-0.111 (0.223)	-0.0682 (0.189)	0.121 (0.163)	0.145 (0.148)	0.160 (0.134)	0.266*** (0.0911)
Dependency ratio	-1.071*** (0.313)	-2.888*** (0.661)	-1.709** (0.730)	-0.926*** (0.205)	-0.839*** (0.172)	-0.961*** (0.159)	-1.078*** (0.154)	-1.020*** (0.151)	-0.725*** (0.147)
Urban	0.838*** (0.217)	0.398 (0.384)	0.631 (0.404)	0.362*** (0.116)	0.465*** (0.0945)	0.384*** (0.0841)	0.330*** (0.0759)	0.321*** (0.0666)	0.191*** (0.0561)
Receiving cash assistance	-0.762** (0.372)	-0.987 (0.633)	-0.382 (0.659)	-0.395** (0.192)	-0.460*** (0.151)	-0.413*** (0.130)	-0.321*** (0.114)	-0.296*** (0.0958)	-0.160* (0.0825)
Receiving pensions	0.337* (0.201)	0.434 (0.406)	0.0601 (0.454)	0.0591 (0.131)	0.203* (0.109)	0.187* (0.101)	0.265*** (0.0964)	0.165* (0.0910)	-0.0344 (0.0773)
Constant	6.208*** (0.548)	8.362*** (1.062)	13.06*** (1.148)	13.09*** (0.327)	13.19*** (0.269)	13.40*** (0.243)	13.77*** (0.233)	13.97*** (0.215)	14.09*** (0.186)
Observations	1,491	1,491	1,491	1,491	1,491	1,491	1,491	1,491	1,491

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 8: Somalia (2016) – Food expenditure per capita model**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Head of household's age	-0.000667 (0.00151)	-0.00108 (0.00136)	-0.00198 (0.00128)	-0.00286** (0.00121)	-0.00361*** (0.00114)	-0.00223** (0.00112)	-0.00195 (0.00127)	-0.000668 (0.00142)	0.001000 (0.00152)
Female head of household	0.112** (0.0463)	0.145*** (0.0406)	0.212*** (0.0370)	0.226*** (0.0335)	0.219*** (0.0304)	0.212*** (0.0292)	0.248*** (0.0328)	0.256*** (0.0356)	0.199*** (0.0368)
Education (Reference: illiterate)									
Lower than secondary education	0.211*** (0.0488)	0.284*** (0.0437)	0.298*** (0.0414)	0.273*** (0.0387)	0.246*** (0.0364)	0.234*** (0.0355)	0.208*** (0.0404)	0.179*** (0.0445)	0.150*** (0.0459)
Secondary education	0.224*** (0.0559)	0.303*** (0.0520)	0.324*** (0.0504)	0.308*** (0.0487)	0.265*** (0.0457)	0.246*** (0.0455)	0.211*** (0.0521)	0.154*** (0.0575)	0.0806 (0.0581)
Post-secondary education	0.311*** (0.0524)	0.419*** (0.0496)	0.483*** (0.0488)	0.450*** (0.0491)	0.469*** (0.0476)	0.448*** (0.0490)	0.466*** (0.0602)	0.486*** (0.0719)	0.437*** (0.0815)
Employment (Reference: out of labour force)									

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Employed	0.0198	0.0510	0.147***	0.202***	0.208***	0.236***	0.308***	0.273***	0.245***
	(0.0695)	(0.0605)	(0.0556)	(0.0509)	(0.0473)	(0.0469)	(0.0548)	(0.0613)	(0.0656)
Unemployed	-0.0472	0.00403	0.0571	0.0616*	0.0739**	0.0627**	0.106***	0.0350	0.0326
	(0.0507)	(0.0432)	(0.0391)	(0.0356)	(0.0323)	(0.0310)	(0.0349)	(0.0376)	(0.0373)
Industry (Reference: real estate and other services)									
Agriculture	0.199	0.169	0.0105	0.0399	0.0535	-0.0196	0.0335	-0.0435	0.0167
	(0.140)	(0.126)	(0.117)	(0.104)	(0.0976)	(0.0940)	(0.112)	(0.123)	(0.145)
Mining and manufacturing	-0.221	-0.0126	0.0299	0.180	0.336*	0.261	0.139	0.307	0.378
	(0.368)	(0.279)	(0.236)	(0.204)	(0.184)	(0.197)	(0.228)	(0.285)	(0.336)
Electricity, utilities and construction	-0.240	-0.114	-0.0542	-0.0468	-0.0511	-0.0399	-0.00372	0.106	0.207
	(0.209)	(0.161)	(0.138)	(0.128)	(0.117)	(0.113)	(0.138)	(0.165)	(0.198)
Commerce	0.00695	-0.197	0.00491	0.0800	-0.0413	-0.165	-0.147	-0.162	0.0854
	(0.220)	(0.231)	(0.188)	(0.172)	(0.174)	(0.158)	(0.183)	(0.191)	(0.238)
Transportation, storage and communication	0.113	0.265**	0.0991	0.0367	0.0960	0.112	0.187	0.168	-0.0494
	(0.140)	(0.110)	(0.122)	(0.121)	(0.110)	(0.115)	(0.141)	(0.168)	(0.169)
Public administration	0.154	0.152	0.135	0.158	0.0866	0.0768	0.0389	0.0425	0.0600
	(0.115)	(0.129)	(0.129)	(0.127)	(0.132)	(0.128)	(0.156)	(0.187)	(0.204)
Dependency ratio	-0.556***	-0.625***	-0.729***	-0.760***	-0.758***	-0.760***	-0.848***	-0.913***	-0.886***
	(0.0678)	(0.0608)	(0.0564)	(0.0528)	(0.0492)	(0.0487)	(0.0572)	(0.0666)	(0.0741)
Receiving remittances	0.119***	0.115***	0.0691*	0.0530	0.0883***	0.0794***	0.108***	0.0968***	0.115***
	(0.0424)	(0.0379)	(0.0358)	(0.0332)	(0.0306)	(0.0295)	(0.0334)	(0.0367)	(0.0380)
Urban	0.279***	0.238***	0.199***	0.173***	0.158***	0.123***	0.139***	0.118***	0.0286
	(0.0488)	(0.0416)	(0.0373)	(0.0335)	(0.0300)	(0.0281)	(0.0306)	(0.0326)	(0.0326)
Constant	4.939***	5.261***	5.567***	5.836***	6.053***	6.197***	6.350***	6.643***	6.931***
	(0.0871)	(0.0793)	(0.0737)	(0.0688)	(0.0646)	(0.0639)	(0.0730)	(0.0832)	(0.0900)
Observations	4,062	4,062	4,062	4,062	4,062	4,062	4,062	4,062	4,062

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Annex II: Simulations results

**Table 1: Egypt – Change in deciles due to loss of jobs in hard-hit sectors (transportation, storage and communication, construction and manufacturing sectors)**

Deciles	1	2	3	4	5	6	7	8	9	10	Total
1	363	0	0	0	0	0	0	0	0	0	363
2	69	328	0	0	0	0	0	0	0	0	397
3	0	102	297	0	0	0	0	0	0	0	399
4	0	0	98	301	0	0	0	0	0	0	399
5	0	0	0	50	297	3	0	0	0	0	350
6	0	0	0	0	30	253	9	0	0	0	292
7	0	0	0	0	0	22	230	13	0	0	265
8	0	0	0	0	0	0	8	202	18	0	228
9	0	0	0	0	0	0	0	0	146	10	156
10	0	0	0	0	0	0	0	0	0	91	91
Total	432	430	395	351	327	278	247	215	164	101	2,940

**Source:** Calculated by the authors using the estimated parameters of total expenditure per capita model and the HIECS (2015).

**Note:** The rows show the deciles based on the predicted values of total expenditure per capita and the columns show the decile using the simulated total expenditure per capita when the heads in hard-hit sectors lose their jobs.

**Table 2: Jordan – Change in deciles due to loss of jobs in hard-hit sectors (transportation, storage and communication, construction and manufacturing sectors)**

Deciles	1	2	3	4	5	6	7	8	9	10	Total
1	78	0	0	0	0	0	0	0	0	0	78
2	41	71	0	0	0	0	0	0	0	0	112
3	0	44	50	0	0	0	0	0	0	0	94
4	0	0	27	51	8	0	0	0	0	0	86
5	0	0	1	21	46	5	0	0	0	0	73
6	0	0	0	1	12	57	6	0	0	0	76
7	0	0	0	0	0	6	46	15	0	0	67
8	0	0	0	0	0	0	5	42	9	0	56
9	0	0	0	0	0	0	0	1	29	3	33
10	0	0	0	0	0	0	0	0	0	18	18
Total	119	115	78	73	66	68	57	58	38	21	693

**Source:** Calculated by the authors using the estimated parameters of total expenditure per capita model and the HEIS (2013).

**Note:** The rows show the deciles based on the predicted values of total expenditure per capita and the columns show the decile using the simulated total expenditure per capita when the heads in hard-hit sectors lose their jobs.

**Table 3: Somalia – Change in deciles due to loss of jobs in hard-hit sectors (transportation, storage and communication, construction and manufacturing sectors)**

Deciles	1	2	3	4	5	6	7	8	9	10	Total
1	8	0	0	0	0	0	0	0	0	0	8
2	1	1	0	0	0	0	0	0	0	0	2
3	0	4	5	0	0	0	0	0	0	0	9
4	0	0	2	4	0	0	0	0	0	0	6
5	0	0	0	6	2	0	0	0	0	0	8
6	0	0	0	0	5	5	0	0	0	0	10
7	0	0	0	0	0	6	2	0	0	0	8
8	0	0	0	0	0	0	9	5	0	0	14
9	0	0	0	0	0	0	0	6	8	0	14
10	0	0	0	0	0	0	0	0	3	14	17
Total	9	5	7	10	7	11	11	11	11	14	96

**Source:** Calculated by the authors using the estimated parameters of total expenditure per capita model and the HFS (2016).

**Note:** The rows show the deciles based on the predicted values of total expenditure per capita and the columns show the decile using the simulated total expenditure per capita when the heads in hard-hit sectors lose their jobs.

## Annex III: Estimated results of food security model using the logarithmic form of adult equivalent food consumption as a dependent variable

**Table 1: Egypt (2015)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Head of household's age	0.000762	0.000715*	0.00109***	0.00146***	0.00166***	0.00241***	0.00279***	0.00434***	0.00709***
	(0.000518)	(0.000424)	(0.000382)	(0.000366)	(0.000383)	(0.000391)	(0.000415)	(0.000493)	(0.000705)
Female head of household	0.108***	0.111***	0.130***	0.142***	0.166***	0.182***	0.188***	0.253***	0.329***
	(0.0187)	(0.0148)	(0.0134)	(0.0128)	(0.0135)	(0.0139)	(0.0151)	(0.0188)	(0.0278)
Education (Reference: illiterate)									
Lower than secondary education	0.0871***	0.0838***	0.0886***	0.0741***	0.0832***	0.0756***	0.0421***	0.0448***	0.0498**
	(0.0205)	(0.0163)	(0.0142)	(0.0133)	(0.0135)	(0.0132)	(0.0134)	(0.0149)	(0.0198)
Secondary education	0.199***	0.189***	0.175***	0.168***	0.171***	0.152***	0.129***	0.134***	0.139***
	(0.0165)	(0.0137)	(0.0121)	(0.0114)	(0.0116)	(0.0114)	(0.0117)	(0.0131)	(0.0171)
Post-secondary education	0.173***	0.190***	0.187***	0.202***	0.227***	0.216***	0.172***	0.203***	0.223***
	(0.0284)	(0.0234)	(0.0216)	(0.0207)	(0.0218)	(0.0226)	(0.0236)	(0.0282)	(0.0390)
Post-university	0.262***	0.279***	0.279***	0.286***	0.315***	0.308***	0.316***	0.356***	0.373***
	(0.0184)	(0.0156)	(0.0144)	(0.0139)	(0.0148)	(0.0155)	(0.0168)	(0.0208)	(0.0299)
Employment (Reference: out of labour force)									
Employed	0.0264	0.0247	0.0396**	0.0257	0.0140	-0.00185	-0.0101	0.00751	0.0174
	(0.0267)	(0.0213)	(0.0189)	(0.0178)	(0.0183)	(0.0185)	(0.0194)	(0.0228)	(0.0302)
Unemployed	-0.0573	-0.110	-0.114*	-0.108*	-0.0993*	-0.121**	-0.0686	-0.00982	-0.0377
	(0.0895)	(0.0773)	(0.0654)	(0.0584)	(0.0579)	(0.0546)	(0.0574)	(0.0751)	(0.0960)
Industry (Reference: real estate and other services)									
Agriculture	-0.00545	0.0366*	0.0318*	0.0325*	0.0548***	0.0695***	0.0560***	0.0705***	0.0735***
	(0.0249)	(0.0200)	(0.0179)	(0.0169)	(0.0172)	(0.0171)	(0.0174)	(0.0197)	(0.0250)
Mining and manufacturing	0.0781***	0.0556***	0.0428**	0.0469***	0.0543***	0.0666***	0.0556***	0.0567**	0.0675**
	(0.0239)	(0.0207)	(0.0189)	(0.0182)	(0.0188)	(0.0189)	(0.0196)	(0.0221)	(0.0277)
Electricity, utilities and construction	-0.0176	-0.0435*	-0.0660***	-0.0466**	-0.0320*	-0.00307	0.00931	0.0239	0.0779***
	(0.0276)	(0.0226)	(0.0201)	(0.0187)	(0.0188)	(0.0185)	(0.0188)	(0.0208)	(0.0268)
Commerce	0.0314	0.0273	0.00353	0.0216	0.0265	0.0595***	0.0489***	0.0858***	0.108***
	(0.0239)	(0.0201)	(0.0184)	(0.0175)	(0.0181)	(0.0183)	(0.0190)	(0.0224)	(0.0293)
Transportation, storage and communication	0.00234	-0.00841	-0.00526	0.0172	0.0219	0.0481**	0.0278	0.0481**	0.0636**
	(0.0263)	(0.0218)	(0.0194)	(0.0184)	(0.0189)	(0.0189)	(0.0192)	(0.0218)	(0.0272)
Public administration	0.00777	0.000188	0.000834	0.0234	0.0300	0.0544***	0.0356*	0.0120	0.0541*
	(0.0245)	(0.0206)	(0.0189)	(0.0182)	(0.0191)	(0.0195)	(0.0201)	(0.0225)	(0.0297)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Receiving remittances	0.0893***	0.112***	0.116***	0.127***	0.133***	0.155***	0.181***	0.202***	0.269***
	(0.0206)	(0.0162)	(0.0144)	(0.0135)	(0.0138)	(0.0140)	(0.0148)	(0.0177)	(0.0246)
Urban	0.000182	0.0207**	0.0331***	0.0416***	0.0585***	0.0662***	0.0827***	0.102***	0.105***
	(0.0123)	(0.0102)	(0.00929)	(0.00882)	(0.00915)	(0.00925)	(0.00966)	(0.0112)	(0.0149)
Constant	7.117***	7.272***	7.360***	7.437***	7.503***	7.554***	7.648***	7.643***	7.645***
	(0.0418)	(0.0329)	(0.0289)	(0.0271)	(0.0279)	(0.0281)	(0.0295)	(0.0345)	(0.0486)
Observations	11,983	11,983	11,983	11,983	11,983	11,983	11,983	11,983	11,983

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 2: Jordan (2013)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Head of household's age	0.00398***	0.00328***	0.00316***	0.00294***	0.00347***	0.00319***	0.00398***	0.00431***	0.00480***
	(0.00149)	(0.00107)	(0.00101)	(0.000991)	(0.000959)	(0.001000)	(0.00108)	(0.00119)	(0.00146)
Female headed of household	0.142**	0.179***	0.208***	0.220***	0.211***	0.227***	0.251***	0.241***	0.271***
	(0.0558)	(0.0390)	(0.0368)	(0.0355)	(0.0343)	(0.0359)	(0.0394)	(0.0447)	(0.0560)
Education (Reference: illiterate)									
Lower than secondary education	0.149***	0.159***	0.143***	0.107***	0.0909***	0.0645**	0.0730**	0.0743**	0.0872**
	(0.0519)	(0.0370)	(0.0341)	(0.0321)	(0.0303)	(0.0308)	(0.0325)	(0.0351)	(0.0430)
Secondary education	0.192***	0.242***	0.225***	0.208***	0.179***	0.143***	0.139***	0.142***	0.159***
	(0.0619)	(0.0444)	(0.0424)	(0.0407)	(0.0392)	(0.0402)	(0.0420)	(0.0452)	(0.0541)
Post-secondary education	0.314***	0.331***	0.269***	0.246***	0.230***	0.188***	0.176***	0.182***	0.147**
	(0.0638)	(0.0490)	(0.0500)	(0.0491)	(0.0480)	(0.0499)	(0.0527)	(0.0574)	(0.0651)
Post-university	0.359***	0.400***	0.449***	0.443***	0.434***	0.451***	0.455***	0.457***	0.489***
	(0.0537)	(0.0411)	(0.0397)	(0.0396)	(0.0395)	(0.0422)	(0.0469)	(0.0536)	(0.0683)
Employment (Reference: out of labour force)									
Employed	0.164***	0.0993**	0.0750*	0.0375	0.0261	0.0305	0.0412	0.00109	-0.0663
	(0.0558)	(0.0436)	(0.0428)	(0.0423)	(0.0410)	(0.0422)	(0.0448)	(0.0489)	(0.0561)
Unemployed	-0.125	-0.126**	-0.171***	-0.173***	-0.155***	-0.152***	-0.183***	-0.193***	-0.193***
	(0.0788)	(0.0552)	(0.0504)	(0.0467)	(0.0431)	(0.0427)	(0.0415)	(0.0430)	(0.0466)
Industry (Reference: real estate and other services)									
Agriculture	-0.188	-0.124	-0.146*	-0.0938	-0.154**	-0.119	-0.0280	-0.0396	-4.93e-05
	(0.121)	(0.0878)	(0.0841)	(0.0795)	(0.0741)	(0.0751)	(0.0813)	(0.0855)	(0.0899)
Mining and manufacturing	-0.0450	-0.00972	-0.0193	-0.0258	0.00486	-0.0207	-0.0731	-0.0635	-0.0190
	(0.0663)	(0.0534)	(0.0537)	(0.0536)	(0.0523)	(0.0540)	(0.0556)	(0.0592)	(0.0629)
Electricity, utilities and construction	-0.225**	-0.203***	-0.181***	-0.112*	-0.112*	-0.149**	-0.0929	-0.0734	-0.0733
	(0.0917)	(0.0688)	(0.0649)	(0.0616)	(0.0586)	(0.0578)	(0.0613)	(0.0651)	(0.0644)
Commerce	-0.0896	-0.0781	-0.0639	-0.0407	-0.0275	-0.0533	-0.0794	-0.0761	0.0210

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	(0.0584)	(0.0476)	(0.0475)	(0.0468)	(0.0454)	(0.0464)	(0.0488)	(0.0522)	(0.0584)
Transportation, storage and communication	-0.171**	-0.157***	-0.122**	-0.110**	-0.111**	-0.149***	-0.141***	-0.144***	-0.00298
	(0.0761)	(0.0591)	(0.0566)	(0.0548)	(0.0523)	(0.0519)	(0.0536)	(0.0554)	(0.0645)
Public administration	-0.000136	0.0296	0.0365	0.0857**	0.0881**	0.0773*	0.0535	0.0199	0.0678
	(0.0451)	(0.0380)	(0.0391)	(0.0396)	(0.0393)	(0.0413)	(0.0444)	(0.0484)	(0.0533)
Receiving remittances	-0.162***	-0.106***	-0.0668*	-0.0599*	-0.0683**	-0.0658*	-0.0677*	-0.0172	0.0252
	(0.0591)	(0.0407)	(0.0372)	(0.0351)	(0.0334)	(0.0340)	(0.0357)	(0.0404)	(0.0498)
Urban	-0.0143	-0.0397*	-0.0264	-0.0307	-0.0298	-0.0130	-0.0129	-0.0186	0.00383
	(0.0315)	(0.0234)	(0.0227)	(0.0221)	(0.0214)	(0.0220)	(0.0230)	(0.0249)	(0.0283)
Constant	5.259***	5.555***	5.736***	5.928***	6.066***	6.233***	6.350***	6.534***	6.734***
	(0.115)	(0.0821)	(0.0765)	(0.0737)	(0.0704)	(0.0722)	(0.0766)	(0.0834)	(0.102)
Observations	4,849	4,849	4,849	4,849	4,849	4,849	4,849	4,849	4,849

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 3: Iraq (2017)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Head of household's age	-0.00710	-0.00459	0.00349	-0.000195	-0.00218	-0.00368	-0.00546*	-0.00361	-0.00104
	(0.00737)	(0.0150)	(0.0147)	(0.00451)	(0.00372)	(0.00341)	(0.00311)	(0.00287)	(0.00252)
Female head of household	0.0367	0.628	-0.338	-0.168	0.158	0.0579	0.131	0.177	0.253**
	(0.316)	(0.594)	(0.605)	(0.189)	(0.155)	(0.142)	(0.134)	(0.124)	(0.115)
Education (Reference: illiterate)									
Lower than secondary education	0.317	0.527	-0.450	-0.0983	0.0214	-0.0729	0.00700	-0.0518	0.0203
	(0.201)	(0.387)	(0.369)	(0.115)	(0.0962)	(0.0876)	(0.0817)	(0.0740)	(0.0617)
Secondary education	0.307	0.0762	-1.148**	-0.414***	-0.280**	-0.228**	-0.0433	-0.0297	0.0541
	(0.246)	(0.514)	(0.499)	(0.152)	(0.126)	(0.115)	(0.109)	(0.0991)	(0.0878)
Bachelor's degree or higher	0.587**	0.478	-1.067*	-0.158	0.136	0.115	0.249*	0.366***	0.264**
	(0.234)	(0.563)	(0.574)	(0.173)	(0.145)	(0.137)	(0.134)	(0.131)	(0.119)
Employment (Reference: unemployed and out of labour force)									
Wage workers	-0.0581	-0.00662	0.524	0.0101	0.0970	0.0457	-0.0801	-0.179	-0.237*
	(0.405)	(0.904)	(0.872)	(0.275)	(0.227)	(0.206)	(0.191)	(0.164)	(0.132)
Self-employed or unpaid workers	0.406	-0.655	-0.299	-0.166	-0.00939	-0.00390	-0.0152	-0.121	-0.115
	(0.319)	(0.755)	(0.709)	(0.226)	(0.183)	(0.165)	(0.151)	(0.124)	(0.0907)
Public Sector	0.345	0.461	-0.388	0.249	0.292	0.397**	0.403**	0.430***	0.422***
	(0.360)	(0.838)	(0.800)	(0.250)	(0.209)	(0.191)	(0.177)	(0.154)	(0.129)
Private Sector	-0.245	0.277	-0.715	-0.107	-0.00648	0.0714	0.110	0.221*	0.258**
	(0.310)	(0.750)	(0.704)	(0.221)	(0.183)	(0.165)	(0.152)	(0.130)	(0.105)
Urban	0.880***	0.518	0.580	0.337***	0.458***	0.421***	0.345***	0.234***	0.200***

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	(0.213)	(0.384)	(0.372)	(0.115)	(0.0934)	(0.0828)	(0.0766)	(0.0691)	(0.0553)
Receiving cash assistance	-0.793**	-0.925	-0.349	-0.633***	-0.421***	-0.389***	-0.198*	-0.142	-0.227***
	(0.368)	(0.645)	(0.610)	(0.188)	(0.145)	(0.125)	(0.116)	(0.106)	(0.0619)
Receiving pensions	0.289	0.469	0.0623	0.0341	0.216**	0.202**	0.153	0.0354	-0.0419
	(0.199)	(0.413)	(0.424)	(0.133)	(0.109)	(0.101)	(0.0946)	(0.0863)	(0.0680)
Constant	6.116***	7.043***	12.27***	13.03***	13.01***	13.34***	13.63***	13.86***	14.01***
	(0.490)	(0.980)	(0.977)	(0.301)	(0.242)	(0.220)	(0.202)	(0.184)	(0.156)
Observations	1,491	1,491	1,491	1,491	1,491	1,491	1,491	1,491	1,491

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 4: Somalia (2016)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Head of household's age	-0.0051***	-0.0036***	-0.0051***	-0.0045***	-0.0054***	-0.0054***	-0.0031***	-0.0024*	-0.00238*
	(0.00173)	(0.00137)	(0.00125)	(0.00114)	(0.00107)	(0.00103)	(0.00109)	(0.00127)	(0.00130)
Female head of household	0.0942*	0.144***	0.177***	0.197***	0.186***	0.213***	0.246***	0.249***	0.215***
	(0.0499)	(0.0400)	(0.0360)	(0.0322)	(0.0298)	(0.0285)	(0.0302)	(0.0343)	(0.0350)
Education (Reference: illiterate)									
Lower than secondary education	0.236***	0.283***	0.295***	0.298***	0.256***	0.240***	0.230***	0.233***	0.155***
	(0.0493)	(0.0422)	(0.0393)	(0.0368)	(0.0356)	(0.0348)	(0.0383)	(0.0451)	(0.0461)
Secondary education	0.235***	0.306***	0.290***	0.310***	0.287***	0.254***	0.224***	0.125**	0.145**
	(0.0586)	(0.0508)	(0.0493)	(0.0467)	(0.0453)	(0.0454)	(0.0491)	(0.0556)	(0.0595)
Post-secondary education	0.339***	0.424***	0.467***	0.499***	0.475***	0.466***	0.473***	0.445***	0.437***
	(0.0567)	(0.0509)	(0.0484)	(0.0467)	(0.0477)	(0.0493)	(0.0567)	(0.0688)	(0.0785)
Employment (Reference: out of labour force)									
Employed	0.0804	0.0616	0.183***	0.230***	0.192***	0.254***	0.322***	0.288***	0.205***
	(0.0713)	(0.0596)	(0.0528)	(0.0491)	(0.0479)	(0.0467)	(0.0524)	(0.0608)	(0.0661)
Unemployed	-0.0123	0.00593	0.0742*	0.0771**	0.0620*	0.0668**	0.0741**	0.0938**	0.0181
	(0.0538)	(0.0426)	(0.0381)	(0.0342)	(0.0318)	(0.0303)	(0.0323)	(0.0365)	(0.0365)
Industry (Reference: real estate and other services)									
Agriculture	0.290**	0.0821	-0.00217	0.0513	0.113	-0.0127	-0.0420	0.0183	0.107
	(0.131)	(0.131)	(0.113)	(0.101)	(0.0963)	(0.0920)	(0.104)	(0.124)	(0.142)
Mining and manufacturing	-0.328	-0.0831	-0.0717	-0.0410	0.155	0.260	0.227	0.350	0.528
	(0.397)	(0.283)	(0.239)	(0.227)	(0.210)	(0.206)	(0.239)	(0.299)	(0.379)
Electricity, utilities and construction	-0.154	-0.149	-0.205	-0.0783	-0.0502	-0.0873	-0.0352	0.0637	0.199
	(0.198)	(0.159)	(0.140)	(0.124)	(0.118)	(0.117)	(0.131)	(0.158)	(0.194)
Commerce	0.0922	0.0631	-0.0883	0.0469	0.0291	-0.0349	-0.0815	-0.219	0.0281
	(0.178)	(0.180)	(0.184)	(0.158)	(0.169)	(0.176)	(0.191)	(0.204)	(0.246)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Transportation, storage and communication	0.0614	0.223**	0.167	-0.0128	0.0441	0.0724	0.0810	0.142	0.142
	(0.147)	(0.107)	(0.107)	(0.116)	(0.113)	(0.112)	(0.135)	(0.165)	(0.190)
Public administration	0.115	0.136	0.0993	0.108	0.204*	0.0617	-0.0820	0.123	0.00496
	(0.117)	(0.122)	(0.121)	(0.117)	(0.118)	(0.135)	(0.147)	(0.188)	(0.203)
Receiving remittances	0.127***	0.0723*	0.0731**	0.0701**	0.0777***	0.0903***	0.0943***	0.0978***	0.0873**
	(0.0452)	(0.0381)	(0.0348)	(0.0319)	(0.0302)	(0.0289)	(0.0311)	(0.0358)	(0.0372)
Urban	0.273***	0.259***	0.196***	0.162***	0.150***	0.110***	0.102***	0.132***	0.0959***
	(0.0505)	(0.0407)	(0.0358)	(0.0320)	(0.0294)	(0.0278)	(0.0291)	(0.0323)	(0.0315)
Constant	5.117***	5.362***	5.649***	5.824***	6.061***	6.235***	6.293***	6.475***	6.843***
	(0.0943)	(0.0761)	(0.0680)	(0.0615)	(0.0575)	(0.0551)	(0.0581)	(0.0661)	(0.0671)
Observations	4,062	4,062	4,062	4,062	4,062	4,062	4,062	4,062	4,062

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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